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ABSTRACT

This report focuses on the education of ninth and twelfth grade minority students living in an urban environment. An explanatory model is employed to analyze each minority group separately. Both the external conditions in which the children live and school conditions and resources that may constrain or facilitate learning are examined in detail. The results demonstrate that the educational process has multiple, interrelated outputs. Belief in the ability to control one's environment and participation in a college preparatory program seem to exert important influences on achievement. Self esteem and internal control seem to play quite different roles, although they correlate highly with each other. The pupil's need of achievement seems influenced by many of the endogenous variables, but it affects only expectations. The results also show that variables associated with the school, such as the racial composition of the classrooms, teachers' ability, teachers' experience, the number of teachers per pupil, and problems in the school, all seem to have important effects on the endogenous variables. According to the results, improving the quality of the teachers in the school will have major beneficial effects on school outputs. (Author/EB)

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Final Report

SIMULTANEOUS EQUATIONS MODELS OF THE EDUCATIONAL PROCESS FOR U. S. MINORITY STUDENTS: AN ANALYSIS OF THE EEOS AND NLS OF 1972 DATA

National Institute of Education Project No. G-74-0070

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SECTION I.

PROBLEM STATEMENT, RELATED RESEARCH, PROCEDURE

1. PROBLEM STATEMENT

In 1970 non-white and minority students numbered 9.3 million or 21 percent of the total enrollment in public schools. Black students comprised 71.4 percent of this group; Spanish-surnamed students (i.e., students of Mexican, Puerto Rican, or other Spanish-speaking origin) were 24.2 percent; Asian American 2.2 percent; and American Indian 2.1 percent (HEW News Release, June 18, 1971). These children exhibit the lowest scholastic achievement scores, the lowest self-concept and sense of personal efficacy (Coleman et al., 1966). They also exhibit the highest drop-out rates. Fifty to 60 percent of Native American children drop out before they reach high school (Phi Delta Kappan 1972: 293). The drop-out rate for Puerto Rican students by the twelfth year of schooling was 80 percent in 1960, compared to 46 percent for Black students and 28.9 percent for Anglos (Bonilla 1972:294). In some Southwestern schools, one of the regions of the country where Spanish-surnamed students are the most highly concentrated, the drop-out rate for Chicanos was 20 percent (Guerra 1972:313). Rural and mountain white children also exhibit the same patterns. When they are added to the numbers of non-white and minority pupils, the conclusion is inescapable that the American education system has failed in reaching a substantial portion of its children.

There are those who would dispute the contention that the schools must share the burden for the lowered performance of minority group students. The more widely publicized research of recent years has tended to stress the importance of factors in the home (Coleman et al., 1966; Jencks 1972) or of hypothesized genetic differences in cognitive functioning (Jensen, 1969; Shockley 1972). Coleman et al. (1966) found that differences between schools account for only a small fraction of differences in pupil achievement. Jensen discusses the failure of pre-school education programs to produce lasting changes in Black children's IQ performance and implies that the culturally deprived child can never catch up with his more fortunate peers.

Recent research, not as widely publicized, contains powerful evidence that pre-school programs can be effective and that schools do make a difference. For example Heber et al. (1972) report the results of a maternal and infant six-year intervention program where the treatment effects on the cognitive development of the experimental group were observed over a period of five and a half years and compared with the cognitive development of a control sample. At 36 months there was a 30 point difference in mean IQ performance in the two groups, and at 60 months there was a 26 point difference between the groups. Stenner and Mueller (1973) describe a less costly and far more extensive program in the number of children served. This is a major six-year pre and early elementary school program funded through Title I and administered by the Chicago Board of Education in low-income areas. Approximately 2,100 children are enrolled in the program which offers up to six years of education. The preliminary results indicate that the traditional gap between advantaged and disadvantaged students can be systematically and substantially eliminated.

Several studies present dramatic evidence of the effect of the school. Guthrie, Kleindorfer, Levin and Stout (1969) review the results of 17 studies dealing with the relationship between school services and student achievement and present their own findings from a study of Michigan schools.

They conclude that a relationship exists between the quality of school services and academic achievement which is independent of the child's social environment. In a study of the pattern of IQ change over a nine year period in an urban school system, Sanday (1973a) and Kadane, McGuire, Sanday, and Staelin (1974) found that change in racial and social class composition in the school were the two most important factors correlated with change in IQ scores. Finally, in a recent analysis of the twelfth grade tapes of the Coleman et al (1966) study Boardman, Davis, and Sanday (1973:1977) and Boardman, Davis and Lloyd (1974) using a quite different statistical procedure than those previously employed find substantial evidence of the importance of teachers and schools. They report that teachers' verbal ability, class size, teachers' experience, school facilities and problems in the school all have significant and important effects on the achievement measures.

Most of the work discussed above examines the relative impact of the independent variables on measures such as achievement or IQ in samples where minority group affiliation is obscured or entered as a dummy independent variable. Cultural pluralism in the U. S. is now well established (Sanday 1972). Cultural differences between minority groups as well as the cultural differences between minority groups and white middle-class America suggest that for each minority group there may be a different set of explanatory variables (or the same set of variables may be interrelated differently) which explain achievement. For example, while it may be found in analyses of total samples that school and home variables are important, it may also be found when each minority group is analyzed separately that different home and different school variables affect achievement, or, the same variables may interrelate differently.

The overall purpose of this research will be to empirically test an explanatory model of the educational process for U. S. minority groups using a national sample measured in 1965 (the Coleman data tapes) and a national sample measured in 1972 (the National Longitudinal Study of the High School Class of 1972 data tapes). The model to be tested as well as the analytic procedures employed in the empirical analysis has been developed by Boardman, Davis, and Sanday (1977) on a sub-sample (N=16,456) of the total twelfth grade sample of the Coleman et al. data tapes, and extended by Boardman, Davis and Lloyd (1974). It is proposed now to perform this analysis on each minority group separately. In order to establish the reliability of the model and the consistency of the results, the analysis will be carried out with the 12th grade and the 9th grade tapes of the Coleman et al. study, and with the 12th grade tapes of the National Longitudinal Study of the High School Class of 1972. By employing such an approach we hope to establish the reliability of our model over age and time periods.

2. THE URBAN CONTEXT

This report focuses on the education of 9th and 12 grade minority children,many of whom live in an urban environment. In order to understand the full dimensions of the process of learning of such children we examine both the external conditions in which the child lives and the school conditions and resources that may constrain or facilitate learning. In this section, we focus on the external environment of the urban school. In following sections we examine the structural processes that affect the child's home environment.

The environment of the older central cities severely undermines the ability of urban public schools to effect equality of opportunity, much less equality of outcomes. In many ways the performance of the public schools merely mirrors the performance of the larger environmental structure and its ability to effect equality of opportunity and results. Moreover, policymakers have allowed the schools to be the focus for remedying inequality rather than attacking the external fundamental issues. It is both unrealistic and unjust to expect the schools to be able to compensate for the effects of unemployment, racial segregation, inadequate housing, and nutrition and family deterioration on the cognitive skills and affective characteristics of the urban child. Educators should acknowledge the limitations of what the school alone can remedy and should counter the disclaimers of the efficacy of education with demands for additional social welfare policies. The current low public attitude towards the schools is more than just a dissatisfaction with declining test scores; it is a dissatisfaction and loss of faith with our public and private institutions. Educators should not be so quick to raise their hands and promise that they, with additional monies, can remedy yet another social problem but rather they should be the first to point to other institutions to assume responsibility.

With this premise stated, what processes within the urban environment constrain the learning of inner city children? First, our central cities are becoming increasingly segregated by income and race as are our urban public schools. This isolation affects the expectations of the poor and minorities concerning their ability to ever be effectively integrated into the economic mainstream (see New York Times Kerner report update). Moreover, the high unemployment of minorities in our central cities, particularly among minority youth with estimates ranging from 39 to 50% (Anderson, 1978), severely weakens the expectations of minority students about the efficacy of education. Jones (1977) reports that among the urban poor, primarily minorities, our society is creating a permanent underclass who exist as "marginal" persons. Ogbu (1978) states that the low achievement levels for urban minorities can be expected given our current job ceilings in this country. Furthermore, Watson (1978) in a national study of violence and vandalism in the schools suggests the availability of jobs for youth in school can contribute significantly to a decrease of such problems.

Inadequate housing is another structural constraint facing the urban child. The general decay of the urban infrastructure in older central cities contributes to housing abandonment and overcrowding (Peterson, 1977). Increasingly the private market is unable to provide adequate housing for the urban poor. In Philadelphia over 70% of the available housing predates World War II with marked deterioration in many areas (Rufolo, 1978). Unfortunately the public sector response has often failed to provide structures conducive to stable home environments. One need look only at the Richard Allen Project or vertical low income housing projects in Philadelphia to see the deteriorative effects of public policy and accompanying social pathologies.

Inadequate employment and housing contributes to high residential mobility in our central cities. The Philadelphia 1970 census indicated that 38.7% families changed homes within 5 years. Other research indicates that residential stability has a positive effect on school achievement and that high residential mobility can impede both school attendance and achievement.

Employment, housing and welfare policies contribute to the deterioration of the family structure and interaction patterns of the inner city family. Recent surveys in New York City indicate that 2 out of every 3 Puerto Rican families is female headed. One should note that this family deterioration among minorities is not a residual from some earlier period (Gutman, 1976) but is a product of the recent urban condition.

Clearly all of these processes impact on the quality of the home environment of the inner city child. Research in education has indicated the powerful effect of the home environment on children's achievement (Coleman et al., 1966; Jencks et al., 1972; Aaron, 1977; Boardman, 1974). Among the home environment attributes that researchers have found to be significantly correlated with children's school performance are education levels of parents, family income, socioeconomic status indices, the presence of reading materials and durable goods ownership (Averch, 1972; Duncan, 1974; Flanagan, 1972; Birch and Gussow, 1970; Wray, 1971; and Goldstein, 1976). Others have analyzed the effects of nutrition (Wray, 1971); health care, (Kaplan et al., 1972), parental time allocation (Liebowitz, 1977), and Lindert, 1977) and housing (Wilner and Walkley, 1963) on children's attendance and achievement. Given the significance of these home variables it is not surprising that the evaluations of Headstart, Follow

Through and Title I and IV have had mixed results. Clearly other compensatory policies are necessary.

Of course further research needs to be done on the quality of interactions between parents and children that contribute to positive cognitive skills and affective characteristics. Marjoribanks (1974) and Williams (1974) review the research on behavior in the home that affects educational behavior. For example, poor minority parents often communicate less with children which may impede their verbal skills. Brookover (1969) found that when teachers worked with parents on techniques to increase parental expectations of children such parent education and resultant changes of expectations and interactions between parents and children improved children's self concepts which in turn would improve their achievement. Just as teachers must learn to use cues, reinforcement/participation feedback correctives in the classroom so must parents. Unfortunately, parent participation in the inner city schools has often been an adversary relationship over school expenditures and busing rather than a mutually beneficial one to enhance student learning at home and school. Government policies (such as Federally funded negative income tax and employment) can increase income in the home but improvement in parent/child interaction at home requires parent education programs, particularly if more immediate effects are desired.

Two recent analyses Maynard (1977) and Maynard and Murnane (1978) examine the effects of the Gary Indiana Income Maintenance Experiment on the school performance of black, inner city children from low income families and suggest that attendance and achievement can be improved by external compensatory policies. This NIT experiment directly and indirectly modified aspects of the home environment such as labor force activity of parents, housing quality, nutrition, health care consumption, Although the results were mixed and limited because of the duration of the program and extent of compensation, their research does suggest particularly that improvement in the housing quality and nutrition could positively affect school attendance and achievement. For example two or fewer persons per bedroom and greater expenditure on food resulted in higher reading test scores among some children.

In conclusion, this section has attempted to describe the possible effects of conditions external from the school on the learning of the inner city child. As has been stated, educators alone cannot remedy these external constraints except perhaps in the area of parent education. However, educators can demand the government to assume a more comprehensive approach for dealing with these problems. These external conditions in the inner city may be so overwhelming that the schools are severely limited in their ability to affect the education of the innder city child. This is not to excuse educators, but compensatory educational programs and policies cannot be viewed as the panacea.

3. RELATED "PRODUCTION FUNCTION" RESEARCH

In this research we model the educational process as a simultaneous equations model which consists of more than one equation, and allows for interaction and joint determinancies among some of the variables. These models apply to situations in which one variable depends on another variable which in turn depends on the first variable. These formulations, then, can model feedback relations between variables. Simultaneous equations estimation techniques were originally developed by statisticians for estimating economic models and for prediction in economics, but, more recently, sociologists, political scientists, educators and other quantitative social scientists have applied the methods to research in their own areas. In this section, we review the research in education which has adopted the simultaneous equations modeling approach. First, however, we will discuss single equation models of the educational process.

Most models of the educational process have the following general form:

$$A_{i,t} = b_o + b_A A_{i,t-1} + b_B B_i + b_H H_i + b_p P_i + b_S S_i + b_T T_i + e_i \quad i=1, 2, ...N \qquad (1)$$

where $A_{i,t}$ = achievement score of student i at time t

$A_{i,t-1}$ = achievement score of student i at time t-1

B_i = a set of attitudes and beliefs held by student i about himself

H_i = a set of home background characteristics of student i

P_i = a set of student body and peer group influences on student i

S_i = a set of school characteristics which influence student i

T_i = a set of teacher characteristics for student i

e_i = an error term for student i

N = number of students

b_O, b_B, b_H, b_P, b_S, b_T denote parameters or vectors of parameters of appropriate dimension.

Equation 1 is an example of a single equation model which econometricians call an educational production function or a simple regression model. An educational production fucntion consists of a single output measured at the end of a period, usually an achievement test score, which is explained by the output measured at the beginning of the period, and a set of individual, teacher, and school characteristics, which are measured during the intervening period. Emphasis centers on identifying various inputs which appear to affect pupil achievement. By controlling for the prior measure of achievement, each coefficient of a variable (the parameters or vectors of parameters noted above) measures the marginal increase in achievement per unit increase in that particular variable during the period of observation. A parameter estimate gives the expected increase in the dependent variable per unit increase in an explanatory variable between t-1 and t. One may use all the estimated parameters and observations on all the explanatory variables to arrive at a predicted value of the dependent variable for each student. Various techniques may estimate the parameters. Often econometricians use the technique of ordinary least squares. This method finds the line which maximizes the sum over all observations of the squared differences between the actual observed value of the dependent variable and the predicted value of the dependent variable. For a justification of the use of equation 1 and for information about how to interpret the estimated coefficients see Boardman and Murnane (1977).

Equation 1 may be generalized to allow some or all of the parameters to differ among different types of students. For example, the coefficients may differ between low socioeconomic students and high socioeconomic students, or the coefficients may differ between students with low initial achievement levels and high initial achievement levels. If all parameters differ between two or more groups the model is called a covariance analysis model and the equations must be estimated separately for each group. If some but not all of the parameters differ among the groups, suitable interaction terms must be included in equation 1. For a discussion of covariance analysis see Johnston (1972).

Many authors of estimated special cases of the model described by equation 1 or by the more general covariance analysis model. Examples are provided by Murnane (1975), Summers and Wolfe (1977), Phillips (1978).

Coleman et al. (1966) used a variant of the single equation model or the educational production function. Since the Coleman data are cross sectional, Coleman included no measure of prior achievement, $A_{i,t-1}$. As a consequence the estimated parameters are interpreted as the total effect of a variable throughout the student's entire life on achievement. Again, see Boardman and Murnane (1977) for more details. In order to determine the importance of an explanatory variable Coleman et al. used step-wise regression where the criterion for the entry of an additional variable into the regression depends upon which of the excluded variables adds most to the amount of the variance explained in the dependent variable (measured by R^2, the coefficient of determination which equals the square of the multiple correlation coefficient).

Coleman et al. (1966) report that after including home background characteristics in the model, adding variables measuring school characteristics did not greatly increase the R^2. Putting this another way, Coleman et al. said that differences between schools account for only a small fraction of the difference in pupil achievement whereas differences between families tend to account for most of the differences in achievement. Of all the school variables the characteristics of a pupil's peer group added most of the R^2. After adding these variables to the regression, it was found that teacher characteristics added more to the R^2 than any other school attributes. The authors concluded that *other resources, on which school systems spend much money, appear* unimportant. These results combined with the finding that school facilities differ little in quantity from school to school suggested that the school can do little to overcome the differences between pupils associated with race and home background.

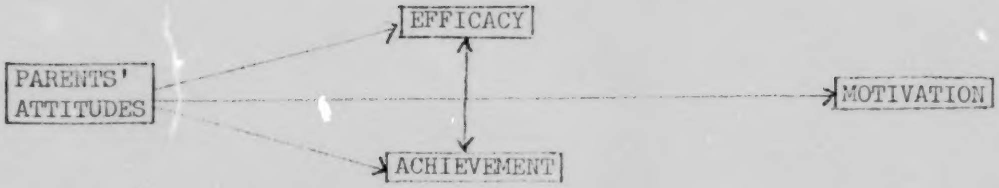
Numerous authors have criticized the methodology of what came to be called the Coleman Report. The most fundamental of these criticisms concerned the use of addition to R^2 as a measure of the importance of a variable. As Cain and Watts (1970) said, "When we have such a model in the form of a regression equation, the regression coefficient is our most useful statistic measuring the importance of a variable for the purpose of policy action." Coleman et al. did not report the regression coefficients. Not surprisingly, numerous authors have re-analyzed the data using ordinary least squares which estimate all the regression coefficients in one step. Marshall Smith (1972) performed one of the most careful regression analyses. He concluded, however, that the results of his re-examination affirm and strengthen the overall conclusions of the Coleman report. Virtually all of the re-analyses reported similar findings.

While all the results of the Coleman Report came from a single educational production function, the authors clearly noted that achievement is not the only output of the educational process. They state, for example, that "the orientations of the children themselves (to) how they fell about themselves, their motivations in school, their aspirations toward further education and toward desirable occupations are in part an outcome of education, and in part a factor which propels the child toward further education and achievement." (p. 275). They also note that a pupil's self-concept is affected by his success in school and as a factor in its own right, is an important outcome of education. In sum these statements imply that the educational process has many outputs and that there might be feedback relations among the outputs.

The book edited by Mosteller and Moynihan (1972) contains a series of re-analyses of the Coleman data tapes. None of these analyses employ a nation-wide sample at a given grade; most of them concentrate on whites in the urban north. None of the re-analyses come to conclusions which depart significantly from those drawn by the authors of the Coleman report. In their introduction Mosteller and Moynihan are clearly aware that the educational process is one which can be conceptualized as one of multiple outputs with feedback between the outputs. They point out, for example, that sense of individual efficacy (personal control and self esteem) may be essentially a feedback reaction from reality. Bright students who get good marks might well feel good about themselves. None of the authors, however, chose to depart from the single educational production function approach which is inappropriate for modeling such a system. Other articles, in the same book, present but do not test simple recursive or simultaneous models. Armor, for example, presents a simple recursive model but estimates only one equation of the model. Dyer presents two interesting simultaneous models but does not verify them empirically.

In our initial work on the 12th grade Coleman tapes (Boardman, Davis and Sanday 1973; 1974) we conceptualize the educational process as one with multiple outputs constitute the set of endogenous variables (i.e. those variables whose values are generated within the system). The home, school, and individual demographic factors postulated to effect the outputs constitute the set of exogenous variables (i.e. those variables whose values are generated outside the system).

Levin (1970) should receive considerable credit for first publishing the notion of modeling the educational process by a system of simultaneous equations.[1] He estimated a model in which pupil achievement, motivation, efficacy, and parents' attitudes (expectations) interact thus:

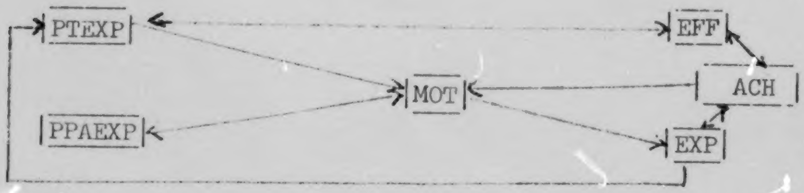


Levin appears to have utilized only sixth grade Whites from the northeast in the empirical estimation of his model. This concentration on specific regions and ethnic groups to the exclusion of others appears typical of the re-analyses of the Coleman data files; including, the re-analyses in Mosteller and Moynihan (1972). Michelson (1970) and Averch and Kiesling (1970) also published estimated simultaneous equations models during the same year.

More recently, Gordon (1973) published a simple recursive model of the educational process with family structure, pupil's verbal ability, parental aspirations, and pupil's self concept and aspirations as the endogenous variables. Because of Gordon's desire to use recursive path analysis rather than more sophisticated interdependent simultaneous equations techniques, the model does not allow for any feedback effects. For this reason, Gordon's model represents a step backwards rather than a step forward from Levin's original formulation.

Boardman, Davis, and Sanday (1973; 1977) extend Levin's work and estimated a simultaneous equations model of the educational process with six endogenous variables and over forty exogenous variables. The endogenous variables were: pupil achievement (ACH), motivation (MOT), expectations (EXP), efficacy (EFF), and perceived parents' expectations (PPAEXP) and perceived teachers' expectations (PTEXP). The exogenous variables included home characteristics such as number of brothers and sisters, social class background of parents, presence of two parents; individual characteristics such as reading before school, number of hours watching TV, length of time in present area of residence; and school characteristics such as racial and peer social class composition in the school, teachers' verbal ability, number of teachers per pupil.

The following diagram represents the estimated relationships between the endogenous variables where the level of confidence exceeds 0.95 for all variables for a sample of over 16,000 drawn from the 12th grade Coleman tapes.



Many of the exogenous variables appeared to have a significant influence on the endogenous variables. For example, ethnic group affiliation, region of the country, certain of the individual demographic characteristics, and most of the school and teacher characteristics were significant in the achievement equation.

After developing the above model we made a number of changes which are described in Boardman, Davis and Lloyd (1974), section IV. While our previous research examines a model of the educational process which has six endogenous variables, an reformulated model contains nine endogenous variables: achievement (ACH), participation in a college preparatory program (CPREP), achievement motivation (ACHMOT), effort (EFFORT), expectations (EXP), self esteem (SELFEST), sense of control (CONTROL), perceived parent's expectations (PPAEXP), and perceived teachers' expectations (PTEXP). Achievement, expectations and perceived parents' and teachers' expectations are constructed from the same variables as in our previous research. Efficacy is now treated as two variables: self esteem (worthiness) and the individual's belief in his ability to control his environment (fate control). Motivation is also treated as two variables: achievement motivation (aspirations) and effort (demonstrated motivation). Participation in a college preparatory program in a new dichotomous variable. The sample was reduced slightly to include only those students who had an opportunity to enter a college preparatory program (N=14974). The estimated relationships among the endogenous variables are described by the following figure, which is taken from Boardman, Davis and Lloyd (1974).

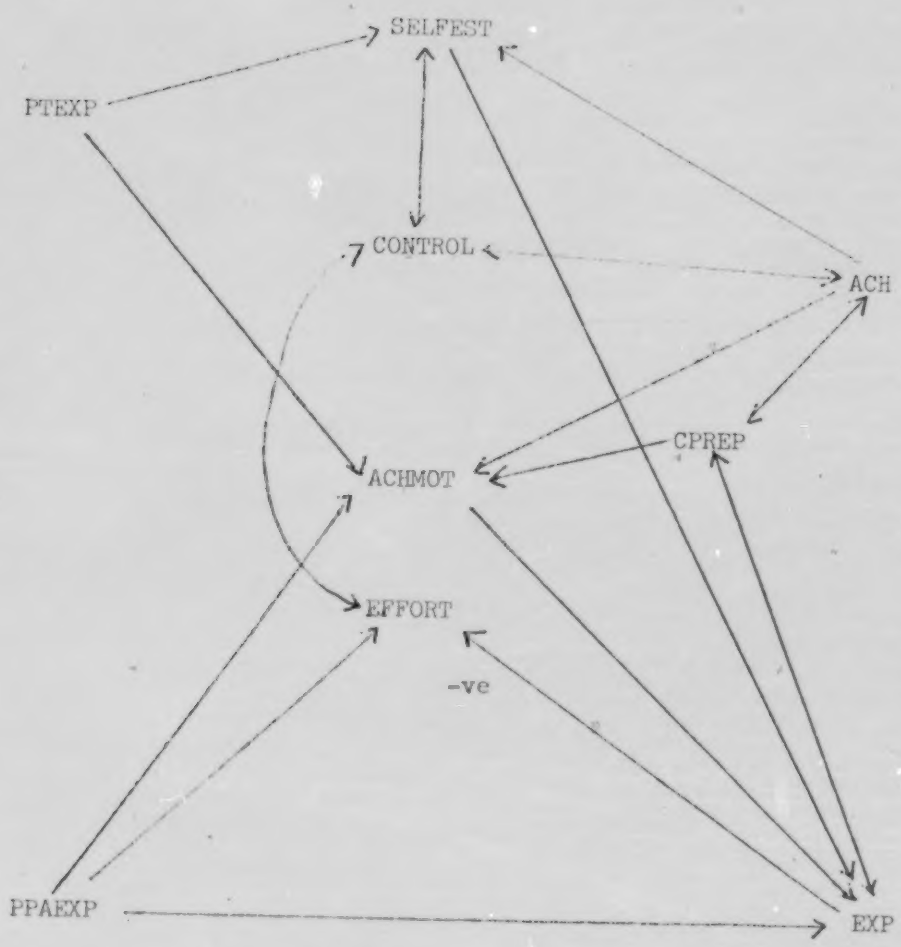

SELFEST
PTEXP
CONTROL
ACH
CPREP
ACHMOT
EFFORT
-ve
PPAEXP
EXP

FIGURE I.1

The estimated relationships among the endogenous variables: 12th grade EEOS data

Some of the results for the exogenous variables appear in Table 1. A + (-) indicates that the exogenous variable has a significant positive (negative) effect on the endogenous variable. A ++ (--) indicates the variable is very significant and 0 indicates the variable is insignificant. We see, particularly for achievement, that teacher and school variables are significant.

TABLE 1.1

The Effects of Selected Exogenous Variables on Achievement, Self Esteem, and the Belief in One's Ability to Control One's Environment

Explanatory Variable	Dependent Variables		
	ACH	SELFEST	CONTROL
Sex	(male) ++	0	(female) ++
Socioeconomic Status	++	0	+
Information in Home	0	0	+
Number of Siblings	–	0	–
Reading Before School	0	+	+
Average SES of School	++	0	+
% of Whites in Classroom	0	0	+
Integrated School	–	+	0
Teachers' Verbal Ability	++	0	0
Teachers' Experience	+	+	+
Problems in School	–	0	0

4. OBJECTIVES

Boardman, Davis and Lloyd (1974) made use of nationwide 12th grade sample drawn from the total 12th grade sample. It does not disaggregate the sample by ethnic group or along any other dimension such as geographical region or ability levels. While it includes the minority groups as dummy variables, this does not allow us to investigate the questions raised in this report. The only statement we can make with reference to the minority groups concerns the degree to which the achievement score gap between these groups and the White sample is closed when the factors included in the model are controlled, and similar statements for the other endogenous variables. The rank ordering of the ethnic groups after controlling for the other variables appears in table 2 for each endogenous variable. Table 3 contains the same information but we can see more easily how each ethnic group perfomrs on the various outputs.

Having tested the procedure and our à priori model with the aggregated sample, our goal now is to disaggregate the sample of ethnic group and perform the same analysis using the 9th and 12th grade Coleman tapes, and in the coming year the student and school files of the National Longitudinal Study of the High School Class of 1972.

Table I.2 Rank Ordering of the Ethnic Groups after controlling for all other variables: 12th grade EEOS

Who has the highest achievement?

1. Asian Americans
2. Whites
3. Others
4. Native Americans
5. Puerto Ricans
6. Mexican Americans
6. Blacks

Who gets into a college preparatory program?

1. Asian Americans
2. Blacks, Native Americans, Mexican Americans
3. Whites, Others, Puerto Ricans

Who has the highest achievement motivation?

1. Blacks
2. Asian Americans
3. Native Americans, and Mexican Americans
4. Whites, Puerto Ricans, Others

Who has the highest effort i.e. who works hard?

1. Asian Americans
2. Blacks
3. Mexican americans
4. Whites, Native Americans, Others, Puerto Ricans

Who has the highest expectations?

1. Asian Americans, Native Americans
2. Blacks, Others
3. Whites and Mexican Americans

Who has the highest self esteem?

1. Blacks
2. Whites, Puerto Ricans, Mexican Americans, Others
3. Asian Americans, Native Americans

Sho has the highest control of the environment?

1. Whites
2. All Other Groups

Table I.3: The performance of Each Ethnic Group on Each Endogeneous Variable: 12th Grade EEOS

Whites:

high belief in ability to control one's environment, achievement
average self esteem
low participation in college preparatory programs, achievement motivation, effort, expectations

Blacks:

high self esteem, achievement motivation
average-high effort
average expectations, participation in college preparatory program
low achievement, belief in ability to control one's environment

Asian Americans:

high achievement, participation in college preparatory program, effort, expectations
high-middle achievement motivation
low self esteem, belief in ability to control one's environment

Native Americans:

high expectations
average achievement, participation in college preparatory program
average-low achievement motivation
low effort, self esteem, belief in ability to control one's environment

Puerto Ricans:

high expectations
average self esteem
average-low achievement
low participation in college preparatory program, achievement motivation, effort, belief in ability to control one's environment

Mexican Americans:

average participation in college preparatory program, self esteem
average-low achievement motivation, effort
low achievement, expectations, belief in ability to control one's environment

Others:

average achievement, expectations, self esteem
low participation in college preparatory program, achievement motivation, effort, belief in ability to control one's environment

5. PROCEDURE

1. The Data. With the exception of the achievement measures, the same set of questions were administered to the 9th and 12th grade samples of the EEOS. The same types of achievement tests were administered to both grades, namely verbal, non-verbal, reading, mathematical, and general informational tests, The verbal test consisted of thirty questions which asked for the best missing word of a sentence, and thirty questions on synonyms. The non-verbal test contained twenty-six questions on picking one figure from a group of five that had least in common with the remaining four, and twenty-four questions on matching a given figure with one out of a group of five. The reading test required students to read seven short passages (from articles, books, letters, sonnets or plays) and answer five questions per passage on content and tone. Twenty-five questions covered mathematics (simple computations and geometry). The last test consisted of ninety-five general informational questions that covered a wide range of interests and areas. All of these tests were developed by the Educational Testing Service (ETS). The verbal test was taken from the school and college ability tests (SCAT). The non-verbal test came from the inter-American tests of general ability. The reading and mathematical tests were each one half of a test from the sequential tests for educational progress, STEP, series. The ETS based the achievement test questions on items to measure those skills which are most important in our society for getting a good job and moving up to a better one, and for full participation in an increasingly technical world.

In addition to the achievement tests, the pupil questionnaires contained over a hundred items in the pupil's personal background, his aspirations, and attitudes. It is a most comprehensive body of data. However, one must question the reliability of the pupil's responses. To research this problem, the authors of the Coleman Report instructed the teachers of seven hundred pupils in two Tennessee school districts to conduct a follow-up study. These teachers investigated school records and interviewed parents. Reliability fell on questions which required information on events which occurred over a year prior to the test. Few questions required such information. For most questions the agreement between the student's response and the information gained by the teachers exceeded 90 percent, and often exceeded 99 percent. On this basis it was concluded that the pupils responded with reasonable accuracy to factual items about themselves, their schooling, and their homes and families.

Jencks (1972), Bowles and Levin (1968), and others have noted deficiencies in the report's reliability section. The report calculated the percentage agreements on the basis that any "don't know," blank, or non-response was in fact a correct answer. Furthermore, when an error occurred, the authors did not present the actual response. For this reason one does not know if the answers almost coincided or differed significantly.

Hanushek and Kain (1972) analyzed and edited the Coleman survey data and claimed to find many obvious cases where teachers, principals, and superintendents coded their answers left justified instead of right justified. We have also studied the data for some time and in some depth and find little or no evidence to support their claim. In particular, the responses by the principals seem most accurate, as far as one can tell. In any case this research draws little on such questions. More importantly Hanushek and Kain also note that while many questions consider the quantities of school facilities, few questions concern quality.

The co-investigators of this research bought the 9th and 12th grade Coleman tapes, sampled from them, refined and recoded the data, and selected certain questions and constructed indices. This has been a time consuming costly procedure due to the sample sizes and the amount of computer time. In the process we have tried to identify certain problems with the data and have developed recoding and refining procedures which overcome these problems to our satisfaction. We believe that no data are perfect, all data banks are subject to criticsm from some angle. No other body of data approaches these data in terms of quantity and scope as well as numbers measured. It is the most comprehensive body of data ever collected on public schools and their students in the United States. Mosteller and Moynihan (1972) refer to the data as "the most important source of data on the sociology of American education yet to appear."

2. Sampling. The 12th grade Coleman sample contains close to 95,000 students. Our sampling procedure yielded about 16,000 students. The major considerations in sampling were to ensure that it contained a sufficient number of Whites, Blacks and other minority groups. A sample of 4,364 Whites, 4,530 Blacks and all of the other minority group students was eventually selected. The Black and White sample was selected so that it is representative of each region. Thus, if 1.8% of the 12th grade Black students in the nation live in region 1 (New England), approximately 1.8% of all the Blacks in the sample come from region 1. Within each region and for each of the two groups the sampling technique is a simple skipping procedure which guarantees that the sample is representative of all the schools in the region. In this way, a sample is constructed which is sufficiently large with sufficient variance in the variables for all

the statistical research. When reading the tapes all records with tape errors were ignored. Similarly, any student who did not respond to either the "Race" or the "Background" question was ignored.

The above sampling procedure yielded 16456 observations; this sample is referred to as EEOS 12.I and appears in column 2 of Table 1.4. When the model was reformulated to include the variable that indicated whether or not a student was in a college preparation program, students were excluded if they attended schools that did not provide a college preparation curriculum. The resultant sample, denoted EEOS 12.II, appears in the third column of Table 4.1.

The 9th grade Coleman tapes contain 134,000 pupils. Using the same sampling procedure our sample contains 22,627 pupils. The EEOS 9th grade sample is larger for two reasons. First, there are more minority students in the 9th grade sample and all minority group students (with the exception of Black students) are maintained in the sample. Second, it was decided to include more Blacks and Whites in the sample in order to ensure that there would be at least two hundred in each region. The final 9th grade sample is presented in the first column of Table 1.4.

3. Refining and Recoding the Data. Cases were rejected from the final samples which did not meet certain criteria for inclusion. The criteria were designed to catch cases with a high proportion of missing information. Approximately 1.28% of the 12th grade sample was rejected using these criteria. This reduced the sample by only a few hundred. Similar decision rules were followed with the 9th grade and the NLS data. The samples presented in Table 1.4 consists of the final samples after all such cases were eliminated.

Table I.4. The EEOS and NLS Sample Sizes

	EEOS			NLS
	9	12.I	12.II	12
Black	5,781	4,364	3,938	1,626
White	7,001	4,530	4,336	11,025
Native American	1,373	1,332	925	153
Asian American	1,025	1,332	1,324	171
Puerto Rican	2,605	1,352	1,127	73
Mexican American	3,840	2,420	2,228	405
Other Latin American	-	-	-	92
Other	1,002	1,126	1,096	669
TOTAL	22,627	16,456	14,974	14,214

All non-responses were recoded. Instead of assigning non-responses the median or modal value for that question, it was decided to examine the mean verbal ability score for each response category. In general, the non-response category was assigned to whichever response category had the most similar mean verbal ability score. Thus, those who gave no response to a question are assigned the response which has an associated mean verbal ability score closest to the respondent's verbal ability.

4. Description of the Variables and Construction of the Indices. The variables to be employed in this research are described in Appendix I, for the EEOS data, and appendix II for the NLS data. The regional dummy variables will be retained in order to determine regional differences within ethnic groups. The reformulated model contains nine endogenous variables and over forty exogenous variables. Some of the variables are indices constructed from several questions or from several test scores. In such cases, each index is constructed from the loadings which resulted from a principal components analysis of the responses to given sets of questions. The details of this procedure are available on request.

5. Estimation Techniques. The model of the euducational process consists of nine linear simultaneous equations. Possible techniques for estimating the model include ordinary least squares (OLS), two stage least squares (2SLS), three stages least squares (3SLS), limited information maximum likelihood (LIML) and full information maximum likelihood (FIML). Ordinary least squares has the property of robustness. However, in simultaneous equation models the ordinary least squares estimator is generally biased and inconsistent. (Dhrymes, Theorem 8, 1970:176). While the 2SLS estimator is generally biased, it is consistent (Dhrymes, Theorem 9, 1970:182),

and as the sample size exceeds sixteen thousand in this case, 2SLS should provide good estimates of the parameters. The 3SLS estimator is efficient (Dhrymes, Theorem 13, 1970:219) and therefore dominates the 2SLS estimator but the 2SLS and 3SLS estimators converge asymptotically and 3SLS is prohibitively expensive. Maximum likelihood estimators also possess the property of efficiency but require considerable computer time. For these reasons, this research will utilize two stage least squares for estimating the parameters.

Subsequent to the start of this research two new procedures have been developed for estimating models of our type, which can be described as an interdependent system with latent (unobserved) variables and multiple indicators. One method, called LISREL, was developed by Jöreskog and his colleagues; see Jöreskog (1973) and Jöreskog and Goldberger (1975). LISREL assumes that all manifest (observed) variables are distributed normally and simultaneously derives maximum likelihood estimates of the parameters. These include both the loadings of the manifest variables and the parameters of the causal model (equivalent to path coefficients). The second approach, called PLS, was developed by Wold and his colleagues; see Wold, (1975a, 1977) and Boardman, Hui and Wold (1977, 1978). This method makes no distributional assumptions and requires only the repeated application of ordinary least squares. Neither of these methods were developed when this research began. However, the method used in this research of first constructing indices using principal components analysis can be viewed as a special case of the PLS procedure.

6. AN OUTLINE OF THE PRESENTATION OF THE RESULTS

As we described earlier the initial model used in these analyses consisted of six exogenous variables: achievement, motivation, expectations, efficacy, perceived parents' expectations and perceived teachers expectations. This model was developed on the basis of the total 12th grade smaple; see Boardman, Davis and Sanday (1977). For this report we estimated separate models for each ethnic group in both the 9th and 12th grades. Section II compares the relationships among the endogenous variables for each ethnic group in both the 9th and 12th grades. Section III contains a detailed discussion of the effects of the exogenous variables on pupil achievement.

After performing these analyses it was decided that efficacy should be split into two variables: self esteem and sense of control, that motivation should be split into two variables: achievement motivation (originally called need for achievement) and effort (originally called demonstated motivation), and that the variable which measured whether or not a student was in a college preparatory program should also be an endogenous variable. At the same time the list of exogenous variables was revised slightly. Boardman, Davis and Lloyd (1974) performed the initial analysis on 12th grade sample 2, which is a subset of the original total 12th grade sample and includes only those students who attend schools that have a college preparatory program This research is presented in Section IV. In section V we present a paper by Boardman, Lloyd and Wood (1977) which analyses the model for the 12th grade Asian American students using the EEOR data. In section VI we present a paper by Boardman and Lloyd (1978) which compares the models for 12th grade Asian American and Puerto Rican students using the EEOR data. In section VII we estimate the model separately for each ethnic group using the 9th and 12th grade EEOR data and the 12th grade NLS data. This section discusses all the results and compares the models in detail.

In section IX we present a paper by Boardman (1978) which explores some of the policy implications of the analyses of the 12th grade EEOR. The policy implications concern the optimal characteristics of the teachers for different ethnic groups and class size.

SECTION II.

INTERPRETATION OF THE 9TH AND 12TH GRADE ENDOGENOUS STRUCTURES

INTRODUCTION

The endogenous variables are conceptualized as both inputs and outputs of the educational process. Five attitudinal variables and one achievement variable constitute the endogenous variables. They determine and are determined by a student's experience with schooling. A student's perceptual world--his beliefs about himself, expectations for the future, thoughts about work and work habits, thoughts about parents and teachers, sense of control over his environment--is as important to schooling as is the usually emphasized score on an achievement test. Indeed, school achievement may in an important way be affected by and affect all of these factors.

We included six endogenous variables in the set of simultaneous equations. The first is a combined measure of scholastic achievement. This variable is a linear combination of the number of answers on the verbal, general informational, reading, non-verbal, and mathematical achievement tests administered to the EEOS 9th and 12th grade samples. The remaining five endogenous variables reflect attitudes, perceptions, and expectations. They are:

1. Efficacy (Eff): includes measures of self-esteem, such as, "I would (not) change to be somebody different," and measures of control, such as, "Whenever I get ahead somebody (does not) stops me."

2. Expectations (EXP): reflects a student's plans for college and his future occupational expectations.

3. Motivation (MOT): includes a pupil's wants, such as, "I want to go far in school (to college)," and work habits, such as, the number of hours spent on homework.

4. Perceived Parents' Expectations (PPAEXP): reflects the student's perception of how well his mother and father want him to do in school and how far they want him to go in school and college.

5. Perceived Teachers' Expectations (PTEXP): reflects the student's perception of how well his teachers expect him to do in class.

The estimated relationships among the endogenous variables for each of the six groups separately are presented in Figures II.1-6.* The arrows in these figures indicate that the estimated relationship between an endogenous variable used as an independent variable and one used as the dependent variable exceeds the .95 confidence level ($<.05$ sig. level). A single headed arrow means that the relationship is unidirectional. Thus $X \rightarrow Y$ refers to the case where X (the explanatory variable) is related above the

* All Figures and Tables mentioned in this section appear at the end of Section II.

.05 level to Y (the dependent variable) but the reverse does not hold. Where two variables are jointly determined (i.e. both show a significant relationship to the other) this is indicated with a double arrow X↔Y. The numbers at the head of each arrow indicate the strength of the relationship.

We examine first the endogenous structures for the similarities and differences between the minority group structures and the White structures. Similarities are defined in terms of the number of significant relationships between the same two endogenous variables found in the White structures and in the minority structures. These commonalities, to be presented below, can be viewed as the part of the core cultural substratum American 9th and 12th grade students share regardless of cultural differences in home and community, and regardless of minority status. The presence of commonalities can be taken as an indication of the degree of cultural homogenization resulting from schooling. The presence of significant differences, to be dealt with following the discussion of similarities, can be taken as an indication of the maintenance of differences in spite of this experience. The source of the differences will be discussed in terms of cultural pluralism and adaptation to minority status.

COMPARISON OF MINORITY ENDOGENOUS STRUCTURES WITH WHITE STRUCTURES
(9th and 12th Grade Samples)

In this section we compare the endogenous structures for the 9th and 12 grade minority samples with the 9th and 12th grade White samples. In Tables II.1 and II.2 the significant relationships between the endogenous variables in the White samples are presented in the left column and in the right columns the presence of the same relationships in the minority samples is noted, or, left blank if the relationship is absent. These tables summarize the information contained in Figures II.1 through II.6. There are four types of totals presented in Tables II.1 and II.2. The first is the number of significant relationships between two variables which are found in the White structures and also in the minority structure. Thus the Oriental 9th grade sample includes 6 significant relationships which are also found in the White 9th grade sample (see Table II.1). The second total is the number of significant relationships in the minority structures which are not found in the White structure. Thus the Oriental 9th grade sample includes 2 significant relationships not found in the White sample. The third total is a count of all significant relationships in each structure. Thus the Oriental 9th grade sample includes a total of 8 relationships. The fourth total is the percentage of the number of significant relationships in the White structure which are absent in the minority structures. Thus 57% of the relationships in the White 9th grade structure are not present in the Oriental 9th grade structure.

There are 14 significant relationships between the 6 endogenous variables in the 9th grade White structure and 13 in the 12th grade (see Figure II.1 and Tables II.1 and II.2. Both of the White endogenous structures are the same with the exception of one significant relationship which does not appear in the 12th grade (Motivation ⟶ Expectations). Thus the White structure is robust over the two grades. As will become readily apparent from examining Figures II.1-6 this is not the case for the minority groups. The endogenous structures for each of these groups changes, in some cases radically, between the 9th and 12th grade samples.

The Black 9th grade endogenous structure (see Table II.1) is the most similar to the White 9th grade structure. Of the 14 significant relationships the Black sample includes 9 of the same relationships. The next most similar are the Native American and the Mexican American 9th grade samples each of which include 50% of the relationships found in the White sample. Thus an argument for commonalities between the White and ethnic samples can be made along with an argument for differences. Table II.1 gives a preliminary indication of where both the similarities and differences lie in the 9th grade. In all six groups Perceived Parents' Expectations and Motivation are jointly determined. The number of hours a student spends on homework, his plans for how far he wants to pursue an education affects and is affected by his perception of how well his parents expect him to do in school and how far they want him to go in his education. The second relationship which is common to all six groups in the 9th grade is the effect of Efficacy on Achievement. Thus a student's sense of control over his environment and future, and his self-esteem have a significant effect on Achievement in all six groups. In four of the groups (Whites, Native Americans, Blacks and Puerto Ricans) Efficacy and Achievement are jointly determined. That is Achievement is both affected by and affects sense of Efficacy. This supports in part the findings of Coleman et al., (1966:22) who said:

> ...a pupil attitude factor, which appears to have a stronger relationship to achievement than do all the 'school' factors together, is the extent to which an individual feels that he has some control over his own destiny.

As our discussion of the exogenous factors will show there are many school factors which are strongly related to Achievement which contradicts the implications of the above statement that school factors can do little. However, it is the case in both the 9th and 12th grade samples that of all the attitudinal endogenous variables only Efficacy affects Achievement and this is the case in all groups.

The source of an individual's sense of control is, according to Coleman et al., (1966:22) largely a consequence of a person's experience in the larger society. Coleman's data show that minority pupils, especially Blacks, Native Americans, Mexican Americans, and Puerto Ricans have far less conviction than Whites that they can affect their own environments and futures. These results are borne out by the sample means for the Efficacy variables which are presented in Table II.3. The degree to which Efficacy is in fact a consequence of experience in the larger society can be investigated by examining the endogenous variables which have an effect on Efficacy along with the exogenous variables. We do this here with the endogenous variables saving an examination of the relationship of the exogenous variables to Efficacy for later analysis. This is an important issue because of the consistent evidence that Efficacy affects many kinds of behaviors such as risk-taking preferences, occupational and educational aspirations, along with academic performance. (see Gurin et al., 1969: 29-30)

Table II.4 presents the role of Efficacy in the 9th grade endogenous structures, and Table II.5 its role in the 12th grade. It is interesting to note from both tables that Efficacy affects more variables than it is affected by in the minority groups but the reverse is the case for the White samples. For 9th grade Whites Efficacy affects Achievement and is affected by Achievement and Perceived Teachers' Expectations. The same holds for 12th grade Whites. Thus the two endogenous variables which come the closest to reflecting a student's experience with the larger society do affect White students' sense of Efficacy. On the other hand it seems to be the case that for the minority groups it is more often the case that internal not external factors affect Efficacy, and that the role of Efficacy for minority students is more one of affecting other factors. The only external factor affecting Efficacy in the 9th grade minority samples is Achievement and this is the case for only three of these samples. In four of the minority groups Motivation affects Efficacy, a factor internal to the student. This changes somewhat in the 12th grade where Achievement, Motivation, and Perceived Teachers' Expectations affect Efficacy in at least three of the Minority groups.

The importance of Motivation in affecting Efficacy for the 9th grade minority students leads us to examine its role (see Table II.4). It is quite clear from this table that Perceived Parents' Expectations has the most consistent affect on Motivation. In fact these two variables are jointly determined in all of the 9th grade samples. We can conclude from this that for 9th grade minority students the external source of Efficacy (when the endogenous variables alone are considered) is their perception of Parents' Expectations mediated by Motivation. For White 9th grade students it is Perceived Teachers' Expectations which is important. It has a direct affect on Efficacy and is not mediated by any other attitudinal factor. Perceived Teachers' Expectations plays no role in the endogenous structures for minority 9th graders. The absence of any significant affect of this variable among minority students and its presence for the White sample suggests that there is an important source which is not working for minority 9th graders--namely teacher attitudes.

Moving to a more thorough examination of the similarities in the 12th grade exogenous structures, Table II.2 shows that by and large the minority group 12th grade structures are more complex in containing more significant relationships. In all but the Black sample there is an increase in the number of these relationships, and in all but the Black sample the differences between the minority and White structure is less in the 12th grade. Well over half of the significant relationships in the Oriental, Native American and Mexican American structures are found in the White structure. While the Black structure was most like the White in the 9th grade it is the least like it in the 12th grade. The Puerto Rican sample becomes more like the White in the 12th grade but is still more different than similar.

What remains the same for all groups is the relationship between Perceived Parents' Expectations and Motivation. These two variables are again jointly determined in all but the Black sample where Motivation no longer affects Parents' Expectations but the reverse holds. The other consistent relationship is again between Efficacy and Achievement. Efficacy is again the only endogenous variable affecting Achievement and in all but the Mexican American sample these two variables are jointly determined.

What changes in the 12th grade is the role of Perceived Teachers' Expectations for the minority groups. This variable now has an effect on minority students' Perceived Parents' Expectations (with the exception of Blacks) and on Efficacy (with the exception of Native Americans and Puerto Ricans). Efficacy is for Whites again determined by the same external factors of Achievement and Teachers' Expectations. For 4 of the minority groups Efficacy is again determined by Motivation and by Teachers' Expectations in 3 of the groups. Thus the role of Motivation remains essentially the same as in the 9th grade sample.

(Continue on Next Page)

ANALYSIS OF DIFFERENCES IN THE ENDOGENOUS STRUCTURES

Where differences are found in the interrelationship between the endogenous variables across the ethnic groups we hypothesized that this would be a function of cultural differences and/or adaptation to minority status. In this section we analyze the differences and suggest explanations where they occur. In this analysis we concentrate solely on those variables which we define as central. A variable is defined as central if it affects at least one variable at the 3 level ($10.0 \leq t$); or at least one variable at the 2 level ($5.0 \leq t < 10.0$) and at least one other variable at the 1 level ($1.5 \leq t < 5.0$). If no variable in the endogenous structure meets these criteria then the variable which affects and is affected by the most other variables is selected.

From Table II.6 it can be seen that there are many more central variables in the White endogenous structures than in the minority structures. In the ninth grade White sample there are 5 central variables and in the twelfth grade sample there are 4. Two observations can be made. The first is that White students participating in the educational process seem to have more going for them. The way they perceive teachers' and parents' expectations, their sense of individual efficacy, their achievement, expectations and motivation all comprise an interlocking system of mutually interacting variables. The second is that the data collected in the student questionnaires administered by the Coleman team may have been based primarily on an understanding of what is important for White students, and not on what is important for culturally different students. While just about everything is central for the White students only perceived parents' expectations and sense of efficacy are consistently central for minority students.

It is interesting to note that with the exception of the Black sample, Achievement and Expectations are central for Whites and not for the minority samples. Scholastic achievement and a student's expectations have traditionally been viewed as the two most important sources driving a student on. The fact that they are not central in the minority group structures (although they feed into variables which are central) may be a consequence of minority students' experience with the larger society. In 1965 when the data were collected the equal employment opportunities movement was barely underway. At that time minority group members were not admitted easily into the opportunity structure whatever their achievement and expectations might have been. One of our goals in the analysis of the data collected in 1972 will be to determine the degree to which this changes for the minority groups.

Concentrating on the White structures (see Figure II.1) it can be said that the attitudinal variables (with the exception of Efficacy) are by and large jointly determined with each other thus constituting a tightly knit system of interactions which affect Efficacy through Perceived Teachers' Expectations. Efficacy in turn affects Achievement which feeds into a student's Expectations. Thus one might say that the 4 attitudinal variables are inputs and Efficacy along with Achievement for White students are outputs. By the 12th grade the impact of achievement on expectations increases, but the pattern of the interrelationships continues to remain similar to the 9th grade pattern. Perceived Teachers' Expectations is again the only variable feeding into Efficacy. This would suggest that for Whites it is their perception of someone elses expectations for them which has the most significant affect on their sense of control, and their scholastic achievement has the most significant impact on their expectations. Thus external sources appear to play a significant role.

This is not surprising. Whereas the members of minority groups, with the exception of Orientals, come from less competitive cultural traditions, Whites participate in the Anglo-American tradition emphasizing aggression, competition, and achievement motivation. They also, as a group, have not experienced discrimination and are made aware of the importance of achievement scores for getting into college and for moving into the world of work. Hence it might be expected that internal feelings would be affected by achievement level and teachers' expectations. If one were to offer a value judgement, this seems as tragic as some have thought minority achievement levels were tragic. To have one's internal sense of self affected by and large by external sources is unlikely in the end to contribute to a very secure sense of self.

For the minority groups internal factors play the most significant role, particularly Perceived Parents' Expectations and Efficacy (see Table II.6.). If one accepts adaptation to minority status as a viable hypothesis, this result makes sense in that it would be expected that minority group members would look inwardly for their main sources of support. For minority students looking inwardly means looking away from the larger society and either to self or to family. The role that parents and sense of control plays for each of the minority groups will be considered below.

For Orientals (see Figure II.2) Perceived Parents' Expectations is clearly the most central variable in both the 9th and 12th grade samples. While Efficacy is important it does not meet the criteria of centrality we have selected for the purposes of this discussion. It can be noted, however, that Efficacy is, as it was for the Whites, more an output than an input. Parents' Expectations has the most consistent and pervasive impact. This is not surprising in view of the emphasis on family in Oriental communities. These communities have traditionally been segregated and tightly knit where kinship, community trust, and ethnic loyalty are strongly emphasized. The extended family traditionally controlled individual behavior putting forth a sense of ethnic and family honor to which all individuals were expected to conform. This, together with rigid self-control, motivation to succeed, emphasis on education are deeply embedded in Chinese and Japanese cultural traditions and have had an important influence on the achievement levels of Orientals in the U.S. (see Sanday, Boardman and Davis 1976) The importance of family and, to a lesser extent, of motivation can be seen in the Oriental structures (Figure II.2). It is not until the 12th grade that Teachers' Expectations enter the picture. In the 9th grade it is Perception of Parents' Expectations which influences Perception of Teachers' Expectations. This relationship is still strong in the 12th grade with the addition that Perceived Teachers' Expectations now begins to look as it did for Whites. Ethnic loyalty and honor, so much emphasized in Oriental communities, would imply that what teachers expect would not be as important as parental expectations.

Perceived Parents' Expectations are also important for Mexican Americans, again for cultural reasons. Ramirez (1967) has said that the traditional culture for these students "...teaches the adolescent to be loyal to his family group.

This frequently results in subordination of the student's educational goals when the family is in need of help...." (quoted in Carter 1970:102) As with the Oriental samples Perception of Parents' Expectations affects Teacher Expectations in the 9th grade and in the 12th grade these two variables become jointly determined. Efficacy, the second central variable for Mexican Americans, may be even more important than Perception of Parents' Expectations. In the ninth grade sample Efficacy has a very strong affect both on Perceived Teachers' Expectations and Achievement with a somewhat weaker affect on Motivation. This is the first example of a case where Efficacy clearly appears to be an input rather than an output. This variable affects more factors than it is affected by. It is interesting to note that Efficacy is not affected by Achievement which is the case for most of the other groups. This suggests that sense of individual control is internally stimulated, quite likely a cultural pattern among Mexican Americans. While Mexican Americans do not score as high on the Efficacy variable as the other groups (see Table II.6) it is important to note here that in the endogenous structures this variable does not tend to be affected by the other endogenous variables.

Perceived Parents' Expectations and Efficacy are important for Blacks in both grades. Both of these variables again appear to be inputs as was the case for Mexican Americans. The difference in the Black structures is that there is no relationship between Perceived Teachers' and Parents' Expectations. Rather, Perception of Teachers' Expectations is a function mainly of a student's expectations for himself. While Perception of Parents' Expectations is strongly related to Motivation and less so to a student's Expectations, it has no effect on Perceived Teachers' Expectations. Parents' Expectations have their major impact on factors internal to the student which in turn affects his perception of Teachers' Expectations. In this sense only are parents important for Blacks. It should be noted that there are three central variables in the Black endogenous structures (as there are in the Puerto Rican structures) while for the other minority groups there is either one or two. Thus, Blacks have more working for them but the pattern of the interrelationships is quite different than in the White structures. While Achievement is central for Blacks in the ninth grade it is not by the twelfth grade. In the 9th grade Achievement affects a student's Expectations but it does not in the 12th grade. In the 12th grade Expectations take the place of Achievement as the third central variable. Thus, one might say, that by the 12th grade the central variables for Blacks are factors internal to the student. In different ways this is the case for all the minority groups which supports the idea that experience with the larger society has an important impact for these groups.

Puerto Ricans also have three central variables in the 9th and 12th grade. While the Puerto Rican structures do not include many interrelationships between the variables, most are at the 2 or 3 confidence level. In the 9th grade Puerto Rican structure Perceived Parents' Expectations and Efficacy are perhaps the two most important of the central variables. As with Mexican Americans, Efficacy is the only source for Perceived Teachers' Expectations. This again may be a cultural pattern in that sense of control is internally stimulated and not a function of the influence of someone external to family and cultural background.

Teachers are important in the Puerto Rican cultural tradition but in this study, at least, they exert an influence only in the 12th grade sample. In discussing this sample it should be noted that approximately 80% of Puerto Rican students drop out before reaching the 12th grade (Sanday 1976). In an analysis of the Puerto Rican drop-out rate, Jacob and Sanday (1976) show that the students who tend to stay in school may be bicultural in that they share mainstream Anglo values while maintaining an identity with the Puerto Rican culture. If this is the case then reference to the Puerto Rican culture should clarify the 12th grade structure. An important characteristic of this culture is submission to adult authority figures. Fitzpatrick (1971:183) has noted that strong authority patterns are characteristic of the Puerto Rican family and that the teacher (at least on the Island) is viewed as an extension of the family. The fact that in the 12th grade structure (see Figure II.6) Teachers' Expectations affects Parents' Expectations and the reverse is not the case supports Fitzpatrick's view for at least this sample. In mainland schools it might very well be the case that Puerto Rican parents act submissively to teachers trusting them, perhaps, as extensions of the family. If this is the case it is quite evident that the role of teachers for Puerto Rican students is enormously important and hence delicate.

Native Americans are discussed at the end because their structures contain the weakest relationships. Indeed, it was not possible to find any variable in the 12th grade structure meeting the criteria of centrality. In the 9th grade the central variable is Efficacy. In the 12th grade if any variable were to be selected it would be Perceived Parents' Expectations because this is the variable affecting and being affected by the most other variables. The Native American results are the most difficult to talk about coherently. In the first place few go to school and of those who do 50-60% drop out before reaching high school. This suggests that the 12th grade sample is skewed and the 9th grade sample may also be unrepresentative. Furthermore, there is the complicating factor that Native Americans come from many different cultural backgrounds. To speak about one Native American culture would be to obscure the complexity.

In an analysis of the same 12th grade Native American sample we use here, Sanday, Boardman and Davis (1976) show that when certain mainstream cultural variables are selected the Native American sample ranks closest to the White sample after the Orientals. This suggested to us that the Native American students in the 12th grade come from the more assimilated families. We performed this analysis in order to show that the minority groups which ranked closest to the White sample on a selected set of socio-cultural variables would have higher mean achievement scores. Coming from work conducted by Sanday (1972, 1973) our position was that the White sample would reflect the mainstream cultural tradition and that closeness to this tradition would result in higher mean achievement scores since achievement tests measure factors a mainstream child would be more exposed to. The rank order decisions were made independently of the White sample means on the selected variables. A rank of 1 was assigned to the group with the highest socio-economic class in home and school, the fewest number of older siblings, the presence of two parents in the home, the best school facilities, the highest average teachers' verbal scores etc.--all of which were factors we believe are characteristic of the Anglo-American cultural tradition which we call the mainstream culture. Similarly, for the achievement tests, a rank of 1 was assigned to the group with the highest mean score. As we expected in most cases the White sample achieved a rank of one using these criteria for ranking.

Furthermore, as we expected, the average group ranks on the socio-cultural variables was the same as the average group ranks on the achievement scores (see 12th grade column in Tables II. 7 and 8.)

This was not a surprising finding but the rank orders among the minority groups did contain some surprises. For example, for the 12th grade sample Orientals ranked the closest to the mainstream and Blacks the most distant with Native Americans in between. This is what led us to the conclusion that the Native American 12th grade sample come from the more assimilated families. This makes sense in view of the drop-out figures for Native American students. If 50-60% drop out before reaching high school then it is likely that those who reach the 12th grade come from families who are more assimilated, at least, in terms of pursuing an education for their children. This is an important finding in view of the following statement made by Jensen in arguing for Black genetic differences in intelligence. Jensen says (1971:12): "American Indians, though considerably more impoverished than Negroes in the United States, score higher than Negroes on tests of intelligence and scholastic achievement." Jensen based these remarks on the reported Coleman data. Our analysis shows that for the 12th grade Coleman sample Native Americans are not more impoverished and they, after Orientals, are the closest to the mainstream White sample. This we say is the reason they score higher.

We performed the same analysis on the 9th grade sample using variables similar to those employed to make the rank order decisions for the 12th grade sample. These data are presented beside the 12th grade data in Tables II.7 and 8 to make comparisons. We are not as correct for the 9th grade data as we were for the 12th. Native Americans achieve an overall average rank of 4 on the socio-cultural variables but retain a rank of 3 on the achievement test scores. For the 12th grade sample Native Americans ranked 3 in both tables. In the 9th grade it is the Mexican Americans who rank 3 on the socio-cultural variables but they rank 4 on the achievement scores. On the other hand, Blacks and Puerto Ricans maintain the same average rank on the socio-cultural variables (Blacks 6 and Puerto Ricans 5), but switch ranks on the achievement scores. Blacks now rank 5 on these scores and Puerto Ricans 6.

Thus, Jensen continues to be wrong in his comments about Blacks and Native Americans for the 9th grade sample also. For, the Native American 9th grade students are still less impoverished than Blacks, when all the socio-cultural variables are taken into consideration. While they may appear to be more impoverished if only the home variables are considered, they are not when the school variables are considered in terms of degree of exposure to mainstream White America. However, when all of these variables are used they are slightly more impoverished than Mexican Americans in the 9th grade but score slightly better than Mexican Americans in the same grade. The difference between them on each of the achievement tests is not great (only a few points). The greatest difference between the groups on the achievement scores is between Whites and Orientals on the one hand and the rest of the groups on the other.

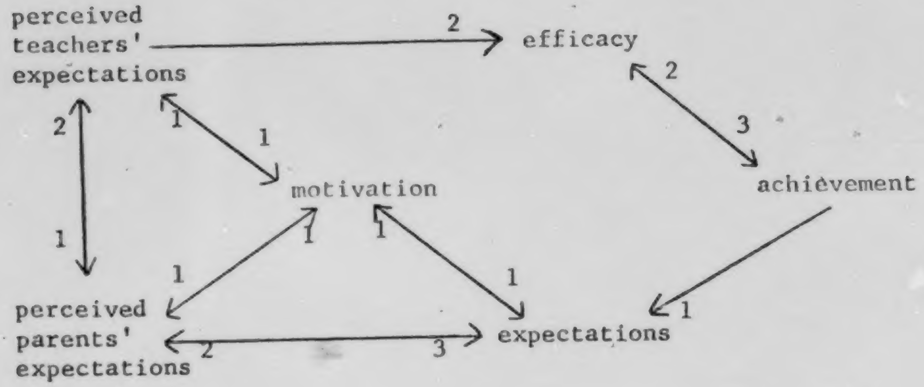
To conclude this section, we can say that evidence has been presented for both similarities and differences in the endogenous structures of the six groups. The similarities were found in the consistent relationship between Perceived

Parents' Expectations and Motivation across groups and grades. The same can be said for the relationship between Efficacy and Achievement with several exceptions. In the 12th grade structures there is a consistent relationship between Perceived Parents' Expectations and Expectations. This is the case in the 9th grade but somewhat less so. These are the relationships which hold in spite of ethnic affiliation. The patterns which are dependent on ethnic affiliation concern the role of Perceived Teachers' Expectations; whether Efficacy is primarily an input or output; the explanation for the role of Perceived Parents' Expectations especially in connection with its affect on Perceived Teachers' Expectations; the number of central variables; and finally the relationship of Achievement to variables other than Efficacy. In this discussion we suggested that the commonalities could be viewed as part of the core cultural substratum American 9th and 12th graders share regardless of cultural differences in home and community, and regardless of minority status. The differences which we found indicate that in spite of the commonalities cultural differences continue. Participation in American schooling does not result in cultural homogenization, nor should anyone expect it to do so. Unfortunately, however, it may be that the differences can in large part be explained in terms of adaptation to discrimination and minority status.

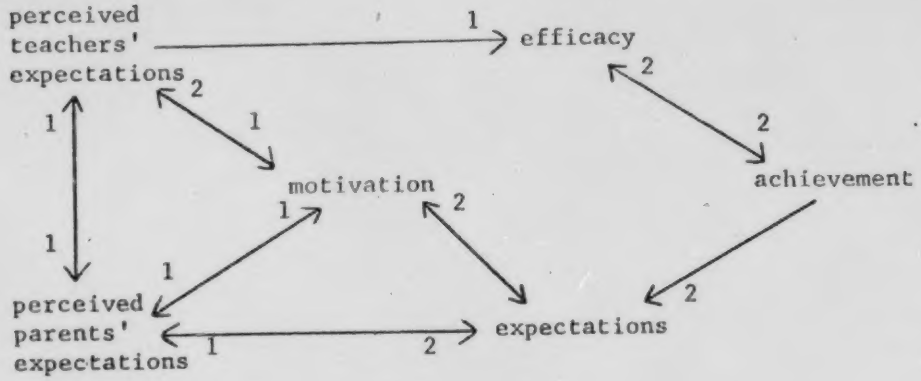
Figure II.1.

WHITE ENDOGENOUS STRUCTURES

Ninth Grade


perceived teachers' expectations
2
efficacy
2
3
2
1
1
1
motivation
achievement
1
1
1
1
1
perceived parents' expectations
2
3
expectations
1

Twelfth Grade


perceived teachers' expectations
1
efficacy
2
2
1
1
2
motivation
achievement
1
2
1
1
perceived parents' expectations
1
2
expectations
2

Strength of Relationship

1 = Weak (but significant $1.5 \leq t < 5.0$)

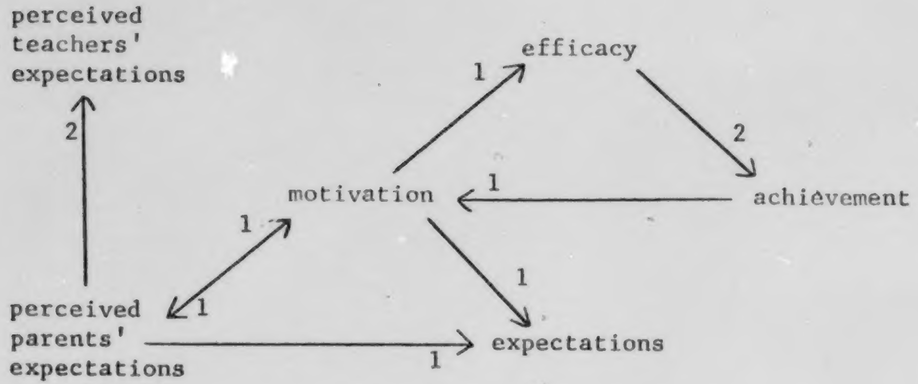
2 = Moderate ($5.0 \leq t < 10.0$)

3 = Strong ($10.0 \leq t$)

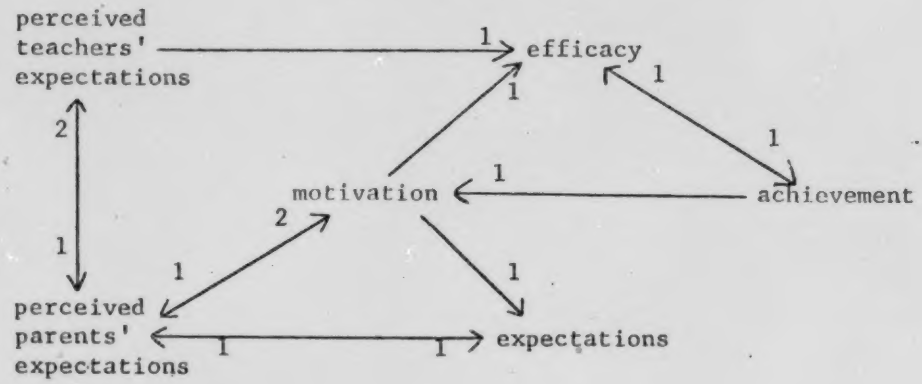
Figure II.2.

ORIENTAL ENDOGENOUS STRUCTURES

Ninth Grade


perceived teachers' expectations
efficacy
motivation
achievement
perceived parents' expectations
expectations
2
1
2
1
1
1
1
1
1

Twelfth Grade


perceived teachers' expectations
efficacy
motivation
achievement
perceived parents' expectations
expectations
1
1
1
1
2
1
1
2
1
1
1
1
1

Strength of Relationship

1 = Weak (but significant $1.5 \leq t < 5.0$)

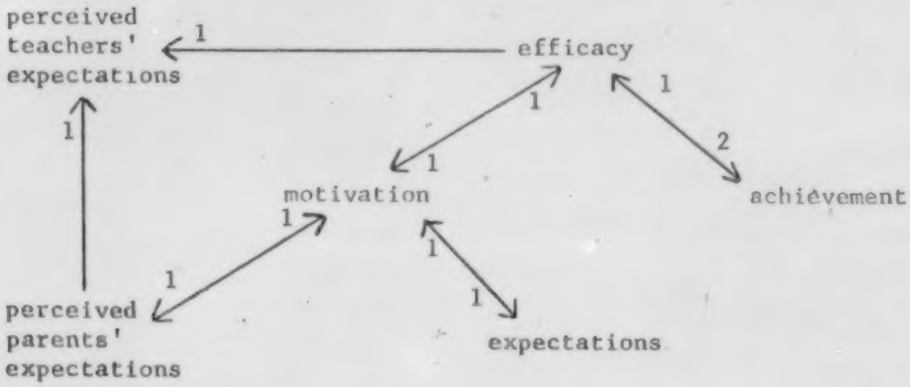
2 = Moderate ($5.0 \leq t < 10.0$)

3 = Strong ($10.0 \leq t$)

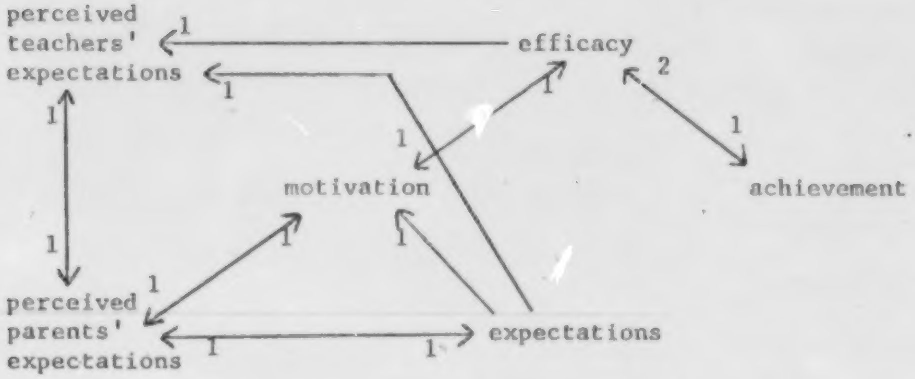
Figure II.3.

NATIVE AMERICAN ENDOGENOUS STRUCTURES

Ninth Grade


perceived teachers' expectations
1
efficacy
1
1
1
2
motivation
achievement
1
1
1
1
perceived parents' expectations
expectations

Twelfth Grade


perceived teachers' expectations
1
efficacy
1
1
2
1
1
motivation
achievement
1
1
1
1
1
perceived parents' expectations
1
1
expectations

Strength of Relationship

1 = Weak (but significant $1.5 \leq t < 5.0$)

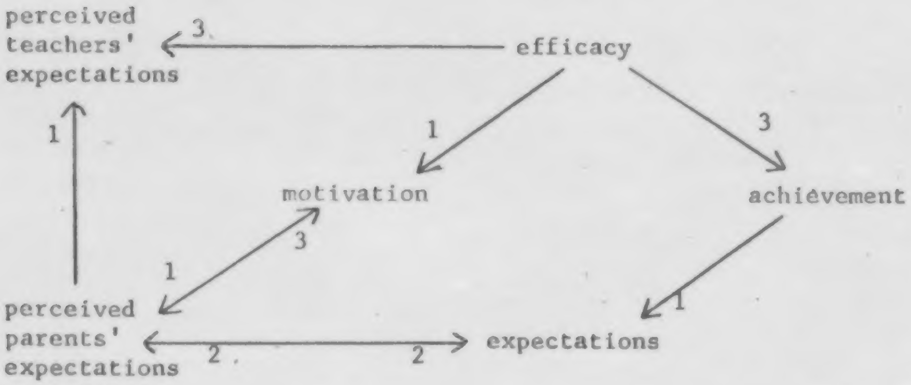
2 = Moderate ($5.0 \leq t < 10.0$)

3 = Strong ($10.0 \leq t$)

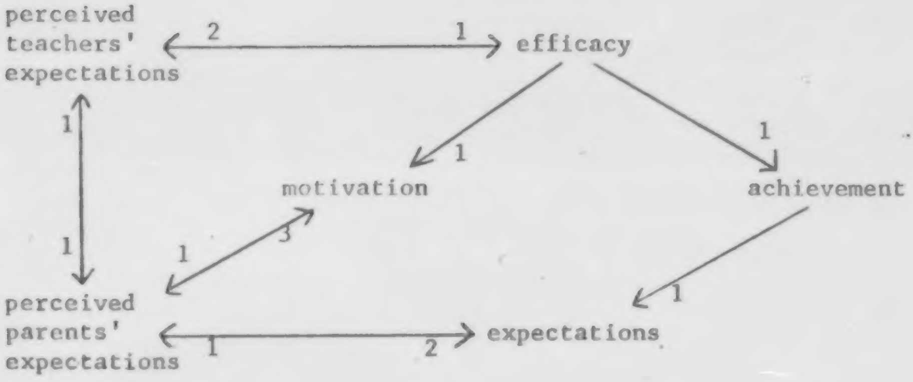
Figure II.4.

MEXICAN AMERICAN ENDOGENOUS STRUCTURES

Ninth Grade


perceived teachers' expectations
3
efficacy
1
1
3
motivation
achievement
3
1
1
perceived parents' expectations
2
2
expectations

Twelfth Grade


perceived teachers' expectations
2
1
efficacy
1
1
1
motivation
achievement
1
1
3
1
perceived parents' expectations
1
2
expectations

Strength of Relationship

1 = Weak (but significant $1.5 \leq t < 5.0$)

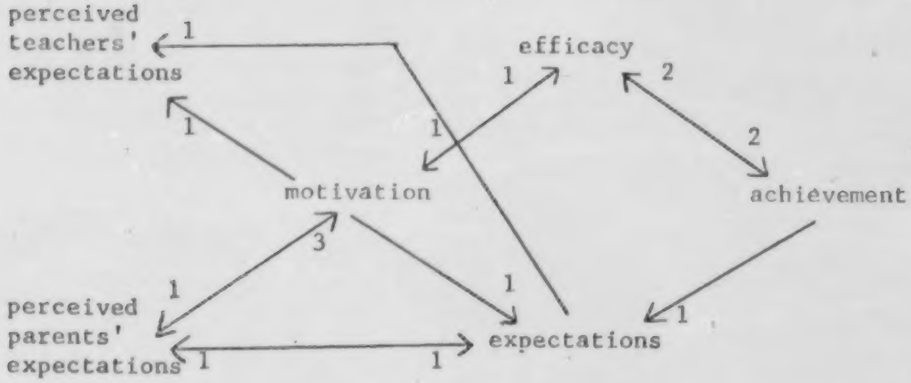
2 = Moderate ($5.0 \leq t < 10.0$)

3 = Strong ($10.0 \leq t$)

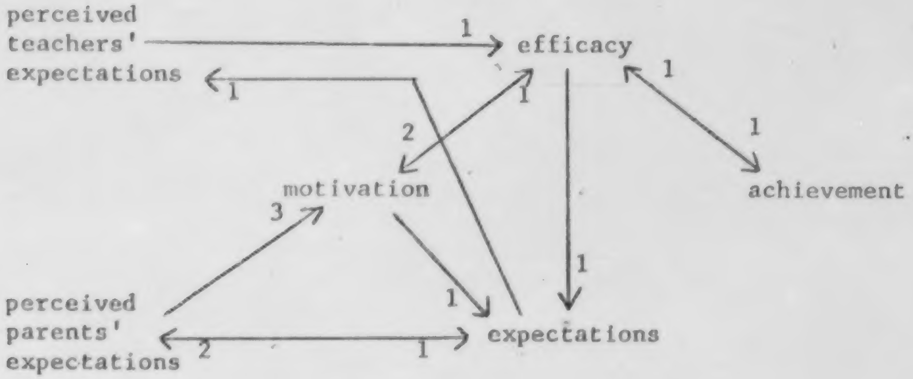
Figure II.5.

BLACK ENDOGENOUS STRUCTURES

Ninth Grade


perceived teachers' expectations
1
efficacy
1
2
1
1
2
motivation
achievement
3
1
1
perceived parents' expectations
1
1
1
expectations

Twelfth Grade


perceived teachers' expectations
1
efficacy
1
1
1
2
1
motivation
achievement
3
1
1
perceived parents' expectations
2
1
expectations

Strength of Relationship

1 = Weak (but significant $1.5 \leq t < 5.0$)

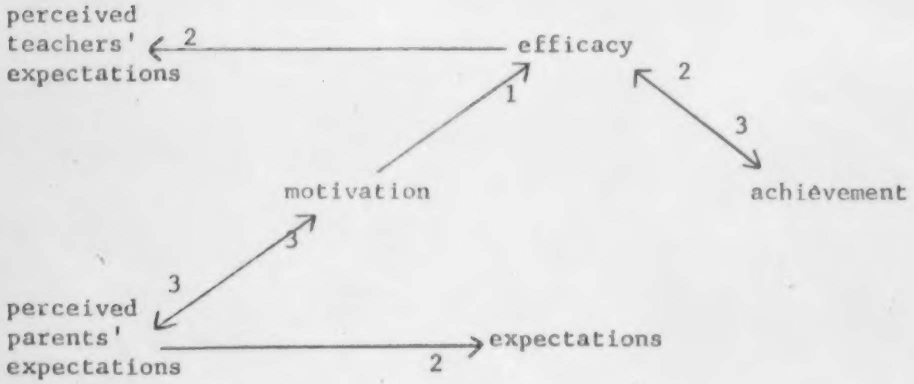
2 = Moderate $(5.0 \leq t < 10.0)$

3 = Strong $(10.0 \leq t)$

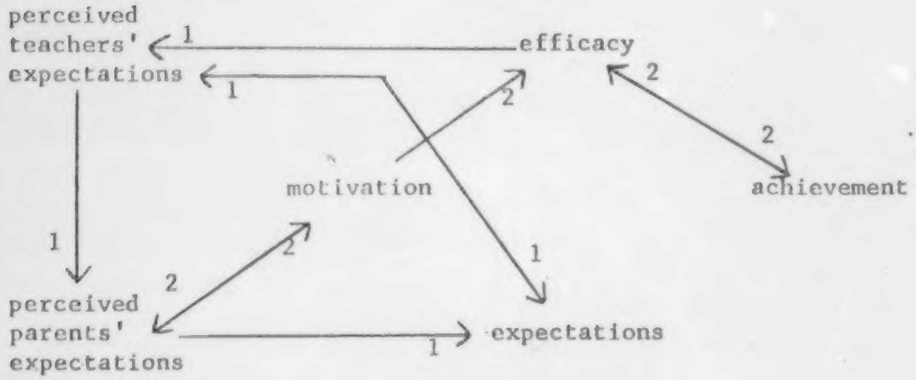
Figure II.6.

PUERTO RICAN ENDOGENOUS STRUCTURES

Ninth Grade


perceived teachers' expectations
2
efficacy
1
2
3
motivation
achievement
3
3
perceived parents' expectations
expectations
2

Twelfth Grade


perceived teachers' expectations
1
efficacy
1
2
2
2
motivation
achievement
1
1
2
2
perceived parents' expectations
expectations
1

Strength of Relationship

1 = Weak (but significant $1.5 \leq t < 5.0$)

2 = Moderate ($5.0 \leq t < 10.0$)

3 = Strong ($10.0 \leq t$)

Table II.1.

COMPARISON OF MINORITY ENDOGENOUS STRUCTURES WITH WHITE STRUCTURE (9th Grade)

9th Grade White Endogenous Structure			Oriental	Native American	Mexican American	Black	Puerto Rican
PERCEIVED TEACHERS' EXPECTATIONS	→ Efficacy						
	→ Perceived Parents' Expectations						
	→ Motivation						
PERCEIVED PARENTS' EXPECTATIONS	→ Perceived Teachers' Expectations		X	X	X		
	→ Motivation		X	X	X	X	X
	→ Expectations		X		X	X	X
MOTIVATION	→ Perceived Teachers' Expectations					X	
	→ Perceived Parents' Expectations		X	X	X	X	X
	→ Expectations		X	X		X	
EXPECTATIONS	→ Perceived Parents' Expectations				X	X	
	→ Motivation			X			
EFFICACY	→ Achievement		X	X	X	X	X
ACHIEVEMENT	→ Efficacy			X		X	X
	→ Expectations				X	X	
Total Number of Common Significant Relationships			6	7	7	9	5
Total Number of Significant Relationships Not Present in White Structure			2	3	2	3	2
Total Number of Significant Relationships in Each Structure		14	8	10	9	12	7
Percent Difference			57%	50%	50%	36%	64%

Table II.2.

COMPARISON OF MINORITY ENDOGENOUS STRUCTURES

WITH WHITE STRUCTURE (12th GRADE)

12th Grade White Endogenous Structure		Oriental	Native American	Mexican American	Black	Puerto Rican
PERCEIVED TEACHERS' EXPECTATIONS →	Efficacy	X		X	X	
	Motivation					
	Perceived Parents' Expectations	X	X	X		X
PERCEIVED PARENTS' EXPECTATIONS →	Perceived Teachers' Expectations	X	X	X		
	Motivation	X	X	X	X	X
	Expectations	X	X	X	X	X
MOTIVATION →	Perceived Teachers' Expectations					
	Perceived Parents' Expectations	X	X	X		X
EXPECTATIONS →	Perceived Parents' Expectations	X	X	X	X	
	Motivation		X			
EFFICACY →	Achievement	X	X	X	X	X
ACHIEVEMENT →	Efficacy	X	X		X	X
	Expectations			X		
Total Number of Common Significant Relationships		9	9	9	6	6
Total Number of Significant Relationships Not Present in White Structure		3	4	2	5	4
Total Number of Significant Relationships in Each Structure	13	12	13	11	11	10
Percent Difference		31%	31%	31%	54%	54%

Table II.3.

MEANS AND STANDARD DEVIATIONS (PARENTHESIS) FOR EFFICACY

EFFICACY	White	Oriental	Native American	Mexican American	Black	Puerto Rican
9th Grade						
$\bar{x}$	1.447	.499	-.709	-.583	-.335	-1.081
SD	(2.883)	(2.923)	(3.198)	(3.355)	(3.621)	(3.686)
Rank	1	2	5	4	3	6
12th Grade						
$\bar{x}$	1.565	-.120	-.650	-.732	-.359	-1.376
SD	(2.856)	(3.132)	(3.310)	(3.637)	(3.905)	(3.911)
Rank	1	2	4	5	3	6

Table II.4.

ROLE OF EFFICACY AND MOTIVATION

(9th Grade Sample)

	White	Oriental	Native American	Mexican American	Black	Puerto Rican
1. Role of Efficacy						
EFFICACY → Achievement	X	X	X	X	X	X
EFFICACY → Motivation			X	X	X	
EFFICACY → Perceived Teachers' Expectations			X	X		X
ACHIEVEMENT → Efficacy	X		X		X	X
MOTIVATION → Efficacy		X	X		X	X
PERCEIVED TEACHERS' EXPECTATIONS → Efficacy	X					
2. Role of Motivation						
MOTIVATION → Perceived Teachers' Expectations	X				X	
MOTIVATION → Expectations	X	X	X		X	
MOTIVATION → Perceived Parents' Expectations	X	X	X	X	X	X
MOTIVATION → Efficacy		X	X		X	X
PERCEIVED TEACHERS' EXPECTATIONS → Motivation	X					
PERCEIVED PARENTS EXPECTATIONS → Motivation	X	X	X	X	X	X
EXPECTATIONS → Motivation	X		X			
ACHIEVEMENT → Motivation		X				
EFFICACY → Motivation			X	X	X	

Table II.5.

ROLE OF EFFICACY AND MOTIVATION

(12th Grade Sample)

	White	Oriental	Native American	Mexican American	Black	Puerto Rican
1. Role of Efficacy						
EFFICACY → Achievement	X	X	X	X	X	X
EFFICACY → Motivation			X	X	X	
EFFICACY → Perceived Teachers' Expectations			X	X		X
EFFICACY → Expectations					X	
ACHIEVEMENT → Efficacy	X	X	X		X	X
MOTIVATION → Efficacy		X	X		X	X
PERCEIVED TEACHERS' EXPECTATIONS → Efficacy	X	X		X	X	
2. Role of Motivation						
MOTIVATION → Perceived Teachers' Expectations	X					
MOTIVATION → Expectations		X			X	
MOTIVATION → Perceived Parents' Expectations	X	X	X	X		X
MOTIVATION → Efficacy		X	X		X	X
PERCEIVED TEACHERS' EXPECTATIONS → Motivation	X					
PERCEIVED PARENTS' EXPECTATIONS → Motivation	X	X	X	X	X	X
EXPECTATIONS → Motivation	X		X			
ACHIEVEMENT → Motivation		X				
EFFICACY → Motivation			X	X	X	

Table II.6.

CENTRAL ENDOGENOUS VARIABLES

White	Oriental	Native American	Mexican American	Black	Puerto Rican
		9th Grade Sample			
PTEXP					
PPAEXP	PPAEXP		PPAEXP	PPAEXP	PPAEXP
EFF		EFF	EFF	EFF	EFF
ACH				ACH	
EXP					
					MOT
		12th Grade Sample			
PPAEXP	PPAEXP	PPAEXP*	PPAEXP	PPAEXP	PPAEXP
			EFF	EFF	EFF
ACH					
EXP				EXP	
MOT					MOT

Explanation:

A variable is defined as central if it affects at least one variable at the 3 level $(10.0 \leq t)$; or at least one variable at the 2 level $(5.0 \leq t < 10.0)$ and at least one other variable at the 1 level $(1.5 \leq t < 5.0)$. If no variable in the endogenous structure meet these criteria, then the variable which affects and is affected by the most other variables is selected and marked in the above Table with an asterisk.

Table II.7.

RANK ORDER OF NON-MAINSTREAM GROUPS REFLECTING DEGREE AND NATURE OF CONTACT WITH MAINSTREAM AMERICA

Variables	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
Home	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade
Student Social Class	1	1	2	2	4	3	5	5	3	4	6	6
Two Parents in Home	1	1	2	2	4	4	3	3	6	5	5	6
# of Older Siblings	1	1	2	2	5	6	6	4.5	3	3	4	4.5
Average Rank	1	1	2	2	4.3	4.3	4.7	4.2	4	4	5	5.5
School Composition												
Average Student Social Class	1	1	2	2	6	4	3	3	4	5	5	6
Prop. White Students in Class Last Year	1	1	5	4	3	3	2	2	6	6	4	5
Mainly Black School (<30% White)	1		5		4		2		6		3	
Prop. White in School		1		4		3		2		6		5
Prop. White Teachers in Class Last Year	1	1	5	5	2	2	3	3	6	6	4	4
Average Rank	1	1	4.3	3.8	3.8	3	2.5	2:5	5.5	5.8	4	5
Teacher Ability												
Teachers' Average Verbal Score	2	2	1	1	4	4	5	5	6	6	3	3
School Characteristics												
Teachers Have Problems with Administration	2	1	6	2	1	4	3	3	4	5	5	6
School Facilities	1	2	2	5	3	3	4	1	5	4	6	6
Problems in School	1	1	2	2	3	4	4	3	6	5	5	6
Mental Tests Given in School	3	1	1	5	4	3.5	2	2	5	3.5	6	[illegible]
Average Rank	1.8	1.3	2.8	3.5	2.8	3.6	3.3	2.3	5	4.4	5.5	6
Total Average (Average of [illegible]rage Rank)	1.5 (1)	1.3 (1)	2.5 (2)	2.6 (2)	3.7 (3)	3.7 (4)	3.9 (4)	3.5 (3)	5.1 (6)	5 (6)	4.4 (5)	4.9 (5)

Table II.8.

RANK ORDER OF ETHNIC GROUPS ON ACHIEVEMENT TESTS

Achievement Test	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade
Verbal	1	1	2	2	3	3	4	4	6	5	5	6
Non-Verbal	2	2	1	1	3	3	4	5	6	6	5	4
Reading	1	1	2	2	3	3	4	4	5	5	6	6
Mathematical	2	1	1	2	3	3	4	4	6	5	5	6
General Informational	1	1	2	2	3	3	4	4	5	5	6	6
Average Rank	1.4	1.2	1.6	1.8	3	3	4	4.2	5.6	5.2	5.4	5.6
	(1)	(1)	(2)	(2)	(3)	(3)	(4)	(4)	(6)	(5)	(5)	(6)

SECTION III.

INTERPRETATION OF THE 9TH AND 12TH GRADE EXOGENOUS ACHIEVEMENT EQUATION

In this section we present the results of our analysis of the influence of the exogenous variables on achievement. The samples remain the same. We look at the factors affecting achievement in the 9th and 12th grade samples disaggregated by ethnic group. Here we only present the results for achievement since this was the dependent variable employed by the authors of the Coleman report. We want to compare our findings using simultaneous equations estimation procedures with theirs using stepwise regression. Furthermore, focusing on achievement is relevant because the traditional emphasis has been on scholastic achievement and success for both individuals and schools has been measured by mean achievement scores. Schools with the highest mean scores are considered to be "doing their job" well, and students with high scores are thought to have a good chance in life. Finally, we were interested in examining the question of how cultural differences might affect achievement differences.

As in the previous section where we assumed that cultural differences would result in the endogenous factors being differently related across ethnic groups, in this section we wish to see if different exogenous factors will influence achievement in each group. In one ethnic group certain home variables may be the most important in explaining achievement, and in another certain school variables may override home variables. Racial composition of the school might turn out to have no effect on achievement in one group and an important effect in another. In further work we will perform the same type of analysis with all of the endogenous variables considered in the previous section. For example, it is very clear from the results we discussed in Section II that it is important to understand more fully the factors affecting Perceived Parents' Expectations and Efficacy.

Before proceeding, we present first the major conclusions of the Coleman report concerning the pattern of segregation they found in the schools and the relative effect of home and school. With respect to segregation it was found that the great majority of American children attend schools that are largely segregated by race, that is, White pupils attend predominately White schools and Black children attend predominately Black schools. (Coleman et al. 1966:3-7) Segregation is less complete for the other minority groups than it is for Blacks. This is also the case in the data we reported in the last section (see Table II.7). In this table Blacks rank 6 on all of the racial composition variables and 5 on the average student social class variable. Puerto Ricans and Blacks are thus in schools with the lowest average student social class, and lowest proportion of White students. The average rank order of the other groups when these variables are considered together is Whites first, Mexican Americans second, Native Americans third, and Oriental Americans fourth.

The second major conclusion of the Coleman report stated that while Whites on the average attend schools with better facilities, this is not a consistent pattern. In fact, regional differences in school facilities exceed the racial differences. (pp. 12-19) Similar patterns were found for access to a college preparatory curriculum and extra curricula programs, and for quality of teachers. These data led the authors to suggest that schools were very close to being "separate but equal." When the factors affecting achievement were analyzed through the use of numerous stepwise regressions the following results were arrived at:

1. After controlling for pupil socio-economic status, differences among schools accounted for only a small fraction of differences in pupil achievement. Families make the difference. (pp. 21-22)

2. The achievements of minority group students depended more on the school they attend than the achievement of Whites.

3. Of the school characteristics, pupil composition related most strongly to achievement followed in order, by teacher characteristics, school facilities, and curriculum. (p. 22)

4. Of all the variables in the survey, the pupil's selfconcept and belief in his ability to control the environment showed the strongest relationship to achievement. (pp. 319-320)

Later Coleman (1970) summarized the effects of the school thus:

> ...the resources most important for a child's achievement in school are the cognitive skills in his social environment in school, including his fellow students as well as his teachers, and that these effects are strongest for the children with least educational resources outside the school....Other resources, on which the school systems spend much money appear unimportant. (p.245)

In this section we will examine all of these variables and many more as they relate to the achievement of each of the ethnic groups considered separately. The effect of a pupil's belief in his ability to control the environment has been discussed in the previous section since this was conceptualized as an endogenous, not an exogenous, variable. We did find in this section that there was a consistent relationship between Achievement and Efficacy for all groups. For most of the groups these two variables were jointly determined. In those cases where they were not jointly determined (Mexican Americans 9th and 12th grades, Orientals 9th grade) it was Efficacy which affected Achievement and not the reverse. The intriguing question which this raises is which affects what initially, or, are the two inseparable parts of the same overall dimension. Whichever, while it is the case that no other endogenous variable affects Achievement others do affect Efficacy. So by working on the factors affecting Efficacy, one would also be working on Achievement. This is another reason for further analysis of the exogenous factors affecting Efficacy. For now, however, we turn to an analysis of the Achievement variable.

Over thirty-five exogenous variables were included in the Achievement equation. Of this number approximately 17 variables refer to school and teacher variables, 14 to home and individual variables, and 7 to regional variables. In the following discussion it will be seen that the conclusions reported by the Coleman research team require extensive modification. For example, with the 17 home and individual variables included in our regression, school and teacher variables are quite important. While the achievement of some minority groups depends more on the school they attend than it does for Whites, the specific school and teacher variables which are important changes for the various groups. There are a few minority groups for which school and teacher variables seem less important.

If one were to single out from the following analysis the one type of variable which has the most consistent impact across minority groups and across the 9th and 12th grades it would be social class composition of the student body and social class background of the student. Unfortunately, when the Coleman team reported that pupil composition of the school was the single most important school characteristic, many interpreted this to mean racial composition. As will be seen, racial composition has varying effects across groups and grades, sometimes mildly significant sometimes not significant at all, and sometimes significant in a direction we would least expect. What is consistently obvious, however, is the importance of student social class.

We move now to a specific discussion of each set of variables. It should be remembered in reading the following that all of the variables discussed in Tables III.1 to III.5 were included in one regression. This means that when any one variable is looked at in any of the five tables it should be interpreted as having a significant positive (+) effect, negative (-) effect, or is not significant when all other variables are controlled. In all cases the signs are taken from the reduced form regression coefficients. The amount of variance explained for each sample is reported in Table III.5. The MLR^2 ranges from 26 to 38%.

HOME AND INDIVIDUAL VARIABLES

The home and individual variables included in the Achievement equation are presented in Table III.1. Sex and age are variables with an effect in many of the ethnic groups. (See Appendix I for description of all variables.) Being female has a negative influence on achievement. Sex is either not significant or where it is significant it is always in favor of males. That is, males do better than females where sex enters into the regression with a significant t-statistic. In the 9th grade, sex is significant only for Blacks and Puerto Ricans and not significant in any other group. In the 12th grade it is significant for all groups with the exception of Orientals, where sex is not significant in either grade. These findings support the often noted trend that girls do less well than boys as they advance in the grades. No one has yet provided an adequate explanation for this phenomenon except to suggest, most likely rightly, that as females grow older they conform to the sex-role sterotype that girls are dumber than boys. The results for Orientals show that there is at least one subculture in the U.S. where sex is not a criteria for successful performance.

Age is significant in all of the 12th grade samples, and in most of the 9th grade samples. The older student does less well. Thus, age has a consistent effect regardless of ethnicity or grade in school. The other variables with a consistent effect are student social class (SES, which has the strongest effect of all the variables); number of older brothers and sisters (NOBAS, the larger the family the lower the achievement measure); and whether the student was read to before entering school (RBS). Being read to before school has a consistent positive effect in all groups with the exception of Orientals where it has a negative effect for the 9th grade sample, and is not significant in the 12th grade sample.

Having a lot of informational material in the home (ie. dictionary, books, magazines - INFO) is very important for Whites and Orientals, and is either not significant for the other groups or weakly significant at one grade but not the other. Having two parents in the home (TWOP) is important in all groups in the 9th grade but is not significant in three of the 12th grade groups. These are Blacks, Whites, and Puerto Ricans. Thus, while father absence may apply to 9th grade Black achievement it does not apply to their 12th grade achievement. Father absence does affect the achievement of 9th and 12th grade Native Americans, Orientals, and Mexican Americans.

Speaking a foreign language out of school (FL) has a significant effect in all of the 9th grade minority groups coming from a non-English language tradition, and is not significant for Whites. For all, but Native Americans, speaking a foreign language has a positive effect. For the former it has a negative effect. The variable is scored so that a low value means frequently speaking a foreign language and a high value never speaking a foreign language out of school. Thus, the positive sign for Native Americans means lower achievement for those speaking a foreign language. These are interesting results relevant to the recent emphasis on bilingual programs. Both 9th and 12th grade Puerto Ricans and Mexican Americans benefit by speaking a foreign language. Only the 9th grade Orientals benefit and this variable is not significant for 12th grade Orientals. Thus, bilingual programs might be more important for Puerto Ricans and Mexican Americans.

The Native American 9th grade sample benefits by not speaking a foreign language out of school. In the 12th grade this variable is not significant. The 9th grade results suggest that it is those who adhere the least to traditional Indian culture who do best in terms of Achievement. This is contrary to the findings of Jacob and Sanday (1976) who found that bicultural Puerto Rican students (students who are bilingual) were the most likely to stay in school. It looks suspiciously as if the Native Americans who are heading for, or are already a part of, the Anglo-mainstream are those who do better in school. It may be that those who wish to preserve their cultural heritage or are not interested in assimilation are those who drop out. If this is the case then bilingual-bicultural educational efforts might reach more Native American children.

The number of hours watching TV (NHWTV) has a positive influence in all the 9th grade samples, with the exception of Native Americans where it is not significant. The relationship between hours watching TV and Achievement is not linear as the sign for the quadradic form of this variable shows (see NHWTV2). In all cases the quadradic form is negative. This together with the positive sign for the linear form (NHWTV) means that as number of hours watching TV initially increases, achievement increases but reaches a maximum at some point and begins to decrease as NHWTV continues to increase. In other words there is a curvilinear relationship between these two variables. The only two groups for which watching TV is significant in the 12th grade are Blacks and Whites. Again the relationship is curvilinear.

There are two variables measuring parental activity in connection with their children's schooling. The first is the frequency parents go to PTA (PTAAT), and the second concerns parents talking about school (PTAS). A negative sign for the former means that going to PTA has a negative influence on achievement, and a positive sign for the latter means that parents talking frequently about school has a negative effect on achievement. As can be seen from Table III.1 these are the only signs which appear for each variable. Parents going to

PTA has a negative effect in both grades for Blacks, Puerto Ricans, and Mexican Americans. It has a negative effect in at least one grade for Whites and Native Americans. It is not significant in either grade for Orientals. These kinds of results are repeated in the variables PTAS (parents talking about school). The variable is scored so that a positive sign means that not talking about school has a positive effect on achievement. It does so in both grades for Blacks and Orientals, and in the 12th grade for Whites, Puerto Ricans and Mexican Americans. This variable is not significant in either of the Native American grades.

It would seem then that parental concern as measured here gives rise to negative achievement. It could, however, be interpreted in the opposite way. Low achievement increases parental concern. If this is the case then these variables would have to be conceptualized as endogenous and not exogenous. That is, it is achievement which affects these variables and not the reverse.

There are three geographical mobility variables. The first (TC) refers to mobility between cities, and the others refer to mobility between schools. None are significant for Native Americans in either grade. Having spent most of their life in this city (TC) is positive for the remaining minority groups and negative for Whites. However, having changed schools (NTCHSCL) many times is negative for Whites and Oriental 12th graders, but positive for Puerto Rican and Mexican American 12th graders. Orientals, thus, require the most geographical stability. However changing schools seems to be better if the last change occurred several years ago as opposed to within the year. The variable measuring the last time a student changed school (LTCHSCL) is positive in all cases. The variable is scored so that the highest value means having changed schools for the last time several years ago.

The most striking pattern to be found in Table III.1 is the relative lack of importance of home and individual variables for Native Americans, and their importance for Whites, Mexican Americans, Blacks, Puerto Ricans, and Orientals in about that order. The most consistently important home variables are socioeconomic status, and number of older siblings. For the minority groups, with the exception of Native Americans, geographical stability is important, while for Whites having lived all of one's life in the same city has a negative influence.

SCHOOL COMPOSITION VARIABLES

Table III.2 gives the results for racial and social-class composition of the school. Average social class of school (AVSES) is very important in all groups in both grades with the exception of Orientals where it is insignificant in the 9th grade. This, of course, confirms one of the major conclusions of the Coleman team, as well as Coleman's statement made in 1970 (quoted above) concerning the importance of fellow students. When average SES of school is controlled the racial composition variables are either not significant or show inconsistent results.

Consider first the proportion of White students in the classroom last year (PWPICLY), as opposed to the proportion of white students in the school. For Whites and Native Americans only, achievement increases as the proportion of Whites in the classroom increases at both the 9th and 12th grade levels. The same relationship holds for Black 12th graders, Puerto Rican and Mexican American 9th graders. Interestingly, the opposite is the case for Oriental and Puerto Rican 12th graders. Achievement decreases as proportion of White pupils in class last year increases. Thus, it can be said that proportion White students in last year's class is consistently positive for only Whites and Native Americans.

Consider now the proportion of White students in the school (PWHITE). This variable must be considered in conjunction with its quadradic form (PWHITE2). Where these variables are significant the sign is positive for the linear form (PWHITE) and negative for the quadradic form (PWHITE2). This means that there is a curvilinear relationship between proportion White in school and achievement. As this proportion increases achievement initially increases and then reaches a maximum and eventually begins to decline as proportion White continues increasing. This pattern is found among Whites, Puerto Ricans, and Mexican American 9th graders (the variables were not included in the 12th grade equation). Thus, these groups perform better in an integrated setting. We cannot say now exactly what proportion White is the best and where achievement begins to decrease. We can only say that being in an all White school is not as good as being in a school which is not all White. For the other 9th grade groups, Blacks, Native Americans and Orientals, there is no relationship between racial composition of school and achievement. Notice that for Black and Oriental 9th graders neither proportion White in school or in classroom last year affects achievement.

To see the effects of proportion White in school at the 12th grade we have included a variable for mainly Black school (MLYBLCK) and a variable for an integrated school (MIX). A positive sign for either means that being in one or the other has a positive effect on achievement. Being in a mainly Black school is negative for 12th grade Native Americans, Orientals, Puerto Ricans, and Mexican Americans. Interestingly it is not significant for Whites and positive for Blacks. For 12th grade Blacks this means that they do better in a mainly Black school.

These results must be understood in relationship to the results for the integration variable. Being in an integrated school is not significant for Blacks, Whites, Orientals, and Mexican Americans. Thus, while being in a mainly Black school was negative for Orientals and Mexican Americans being in an integrated school has no effect. It does, however, have a negative effect for Native Americans and Puerto Ricans. Integration is defined here as 30%-69% White, which implies that these are the only two minority groups for which an all White setting (ie. above 70% White) has a positive effect on achievement.

These results must be interpreted keeping in mind that average socioeconomic status of the school is controlled. This means that when the effect of this variable is accounted for, the racial composition variables have the effect that has been described. It is interesting to note that when average SES is controlled racial composition of the school is by and large not significant for Blacks. It is significant only in the 12th grade where it is better for Blacks to be in a mainly Black school. Since average SES is so important it is clear that integration, if its purpose is to maximize achievement, should be along social class lines. Obviously, this is a practical impossibility given the present social class composition of most urban-suburban areas. What these results do say is that racial integration in low socio-economic areas (as in the case in most urban centers) is not going to have the perceived desired effect, if that effect is solely to maximize achievement. If the goal is to maximize inter-racial communication that is another matter.

Finally, a high proportion of White teachers in class last year (PWTCHLY) is not significant for Blacks, but is significant at both grade levels for Whites, Native Americans, and Mexican Americans. It is significant at only one grade for Orientals and Puerto Ricans. This further confirms the unimportance of racial integration for Black students when average socio-economic status of the school is controlled.

TEACHER VARIABLES

The results for the teacher variables (see Table III.3) are summarized as follows:

1. Teacher's average verbal score (TAVR) is not significant for Whites and is significant for all minority groups at least in one grade. It is very important for Blacks and Puerto Ricans in the 12th grade.

2. The number of teachers per pupil (NTPRPUP) is significant for all groups at least in one grade. The only group for which it is significant in both grades is Whites.

3. Teacher's average number of years teaching (TANYTCH) is negative for Blacks (12th grade), Puerto Ricans (9th and 12th grade), and Mexican Americans (12th grade). It is positive for Native Americans (9th grade) and not significant at both grade levels for Orientals and Whites. The relationship between number of years teaching and achievement is, however, curvilinear as can be seen be examining the sign for TANYTCH2. For Blacks, Puerto Rican, and Mexican American 12th graders the sign for the quadradic form is positive which means that while there is an initial decrease in achievement as the number of years teaching increases at some point achievement begins to increase as number of years teaching continues increasing.

4. The sex of teachers (TASEX) is not significant for Blacks, Whites (9th grade only), Native Americans, and Mexican Americans. White 12th graders do better where there are more males, and so do Puerto Ricans at both grade levels. Orientals do better where there are more female teachers at both grade levels.

5. Having more teachers from this city (TPTC) is positive for Orientals (9th grade), and negative for Black and Native American 12th graders and Mexican American 9th graders. It is not significant at any grade for Whites and Puerto Ricans, and at one grade for the other groups.

6. Teachers having problems with school administration (TAPB9) is positive for Native American and Mexican American 9th graders and not significant for the other 9th grade groups. At the 12th grade (TPADTN) it is

positive for Blacks, Whites, and Mexican Americans, and not significant for the other groups.

7. A higher teacher turnover (NTCHLV) is positive for Black, Oriental 9th graders and for Native American, Puerto Rican and Mexican American 12th graders. It is not significant for the other groups.
8. Number of times a student talks to a guidance counselor (NTLKGC 12th grade and SEEGC 9th grade) is very important for all groups in all grades. In the 9th grade especially this variable has a very strong effect.

To summarize, the teacher variables are very important for the minority groups and less so for Whites. At the 9th grade there is only one teacher related variable which is significant for Whites, and there are at least three which are significant for the minority groups (in some cases four). At the 12th grade more teacher variables are important for Whites, and they remain important for the minority groups.

SCHOOL FACILITY AND ATMOSPHERE VARIABLES

These variables are significant mainly for Blacks, Whites, and Orientals in that order. The results for these variables (see Table III.4) are summarized as follows:

1. More school facilities (FACILITS) are important for Black 9th graders and Oriental 12th graders. This variable has a negative effect for White and Mexican American 9th graders, and for Puerto Rican 12th graders. School facilities are not significant for Native Americans at either grade level.
2. Problems in the school (PROBLEMS) which is a measure taken from principal's responses about problems of damage, discourtesy, and violence to teachers is negative in both grades for Blacks. It is not significant in all other groups with the exception that for White and Oriental 9th graders it is positive.
3. The age of the school (AGES) is not significant in at least one grade for all groups. Black and White 9th graders benefit by being in a newer school, as do Oriental 12th graders. Native American 12th graders benefit by being in an older school.
4. Giving mental tests (TEST) (such as IQ) has a positive effect on 12th grade achievement of Blacks, Whites and Native Americans.
5. Principals who have higher degrees (PRNMADEG) has a negative effect in at least one grade in all groups but Blacks where it has a negative effect at both grade levels.

REGIONAL VARIABLES

The regional variables (Table III.5) are standard metropolitan statistical area and region of the country. The SMSA variable is scored differently for the 9th and 12th grade samples. A negative sign at the 9th grade means being outside of a standard metropolitan statistical area, and at the 12th grade means being in a SMSA. Being in a SMSA is not significant in at least one grade in all groups, but Native Americans. This group does better outside of a SMSA in the 9th grade and inside a SMSA in the 12th grade.

Each of the regional variable signs should be interpreted as meaning doing better, worse, or no differently in the region in question than in the Far West, the only region excluded from the regression equation. Thus, Black 9th graders do better in all the regions (with the exception of the South West) than they do in the Far West. Oriental 9th graders do worse in all the regions (with the exception of New England and the Plains) than they do in the Far West. Native Americans do better in the Lakes and Plains than they do in the Far West.

CONCLUSION

It is clear from the above discussion that school factors do make a difference even when a large number of home factors are controlled. The number of home and school factors which are significant for each of the groups at both grade levels are summarized in Table III.6. Even for Whites there are numerous significant school variables. With respect to the Coleman report finding that the achievement of minority group students depend more on the school they attend than the achievement of Whites, it can be seen that this statement can be modified by examining the number of significant home and school variables for each ethnic group for each grade in Table III.6.

In the 9th grade more home than school factors tend to be significant. This is especially the case for Blacks, Orientals and Puerto Ricans. About an equal number of home and school factors are significant for Whites and Mexican Americans. Only for Native Americans are there more significant school factors in the 9th grade. It is in the 12th grade where the Coleman report statement concerning the greater effect of the school is borne out by our results. For in the 12th grade many more home factors are important for Whites than for all of the other minority groups with the exception of Mexican Americans for whom two more home than school variables are significant. In the other groups school factors are more numerous, particularly for Native Americans and Puerto Ricans.

The cultural difference hypothesis would suggest that there should be more important school variables than home variables in culturally different groups. This is because achievement tests measure Anglo beliefs, values, attitudes and cognitive components. Therefore, culturally different students would be expected to pick up what they need for success on these tests in the school. Table III.6 indicates that home and school are equally important for all groups at the 9th grade, and it is at the 12th grade when school becomes more important for the non-mainstream groups. This does not fit the cultural difference hypothesis as well as the suggestion that school is more important at the 12th grade level for minority groups because this is the point at which they are about to embark into the larger society. At this point school may become for them more a reflection of the larger society and more decisive as to the attitudes and values affecting their achievement levels. Of course, this is a process which may begin after the 9th grade when the students become full-fledged high school students. The evidence for cultural differences can be found in the results for speaking a foreign language out of school and teachers' average verbal right. Whites are not affected by the foreign language variable but the non-English tradition groups are. Speaking a foreign language out of school is an indication of cultural difference. It means maintaining at least one non-Anglo tradition in the home. Students who are bi-lingual are probably bi-cultural. The interesting point about the foreign language result is, with the exception of Native Americans, bi-cultural students may be the better achievers. On the other hand, the results for Native Americans suggest that only the assimilated achieve better. Teacher's average verbal right is significant for all groups but Whites. This suggests cultural difference because of the implication from this result that the culturally different students are picking up mainstream verbal facility not in the home as are the Whites, but at school. The verbal facility in the home of culturally different students may be more oriented to the home cultural tradition. Finally, getting around the country seems to have a negative influence on minority achievement and a positive influence on White achievement. There are many possible interpretations for these results. Minority group families who move a lot may be those without jobs, and White families who move may be those with jobs. Minority children who move frequently may find it difficult to establish a sense of being rooted.

Table III.1.

EFFECTS OF HOME & INDIVIDUAL VARIABLES ON ACHIEVEMENT

9th & 12th Grades

Variable Name	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade
SEX	NS	--	NS	NS	NS	--	NS	-	-	-	-	-
AGE	NS	--	NS	-	--	-	--	--	--	--	--	-
SES	+++	+++	++	++	++	+	++	+	+++	+++	++	+
INFO	++	+++	+	++	NS	NS	NS	+	NS	NS	+	NS
TWOP	+	NS	+	+	+	+	++	+	+	NS	+	NS
NOBAS	--	--	-	-	-	-	--	-	-	--	-	NS
FL	NS	NS	-	NS	+	NS	-	-	NS	...	-	-
RBS	++	+	-	NS	+	+	+	+	+	+	+	+
PTAAT	NS	-	NS	NS	NS	-	-	-	-	-	-	-
PTAS	NS	+	+	+	NS	NS	NS	+	+	+	NS	+
TC	-	-	+	+	NS	NS	+	NS	+	+	++	+
NTCHSCL	-	-	NS	-	NS	NS	NS	+	NS	NS	NS	+
LTCHSCL	+	+	NS	+	NS	NS	++	++	++	+	+	+
NHWTV	++	+	+	NS	NS	NS	++	NS	++	++	+	NS
NHWTV2	--	--	-	NS	NS	NS	--	NS	--	--	-	NS

Key:
+, -	$1.5 \leqslant t < 5.0$
++, --	$5.0 \leqslant t < 10.0$
+++, ---	$10.0 \leqslant t$
NS	Not Significant
...	Not included

Table III.2.

EFFECTS OF SCHOOL COMPOSITION VARIABLES ON ACHIEVEMENT

9th & 12th Grades

Variable Name	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade
PWPICLY	+	+	NS	-	+	+	+	NS	NS	+	+	-
PWHITE (9th Grade only)	+	...	NS	...	NS	...	+	...	NS	...	+	...
PWHITE2 (9th Grade only)	-	...	NS	...	NS	...	-	...	NS	...	-	...
MIX (12th Grade only)	...	NS	...	NS	...	-	...	NS	...	NS	...	-
MLYBLCK (12th Grade only)	...	NS	...	-	...	-	...	-	...	+	...	-
AVSES	++	+	NS	+	+	+	++	++	++	++	++	++
PWTCHLY	+	+	+	NS	+	+	++	+	NS	NS	NS	+

Table III.3.

EFFECTS OF TEACHER VARIABLES ON ACHIEVEMENT

9th & 12th Grades

Variable Name	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade
TAVR	NS	NS	NS	+	+	+	+	+	+	++	NS	++
NTPRPUP	+	+	NS	+	+	NS	+	NS	+	NS	+	...
TANYTCH	NS	NS	NS	NS	+	NS	NS	-	NS	-	-	-
TANYTCH2 (12th Grade only)	...	NS	...	NS	...	NS	...	+	...	+	...	+
TASEX	NS	-	+	+	NS	...	NS	NS	NS	...	-	-
TPTC	NS	NS	+	...	NS	-	-	NS	NS	-	NS	NS
TAPB9 (9th Grade only)	NS	...	NS	...	+	...	+	...	NS	...	NS	...
TPADTN (12th Grade only)	...	+	...	NS	...	NS	...	+	...	+	...	NS
NTCHLV	NS	NS	+	NS	NS	+	NS	+	+	NS	NS	+
NTLKGC (12th Grade only)	...	++	...	+	...	+	...	+	...	++	...	++
SEEGC (9th Grade only)	+++	...	++	...	++	...	+++	...	+++	...	+++	...

Table III.4.

EFFECTS OF SCHOOL FACILITY AND ATMOSPHERE VARIABLES ON ACHIEVEMENT

9th & 12th Grades

Variable Name	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade
FACILITS	-	NS	NS	+	NS	NS	-	NS	+	NS	NS	-
PROBLEMS	+	NS	+	NS	NS	NS	NS	NS	-	-	NS	NS
AGES	-	NS	NS	-	NS	+	NS	NS	-	NS	NS	NS
TEST	NS	+	NS	...	NS	+	-	...	NS	+	NS	...
PRNMADEG	-	NS	NS	-	NS	-	NS	-	-	-	NS	-

R^2 Reduced Form
Achievement Equation.
With all variables
listed in Table III.1.

Table III.5.

EFFECTS OF REGIONAL VARIABLES ON ACHIEVEMENT

9th and 12th Grades

Variable Name	White		Oriental American		Native American		Mexican American		Black		Puerto Rican	
	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade	9th Grade	12th Grade
SMSA	-	NS	NS	+	-	-	NS	NS	NS	NS	NS	+
NEWENG	+	NS	NS	NS	NS	NS	+	+	+	NS	NS	+
MIDATL	NS	+	-	+	NS	NS	NS	NS	+	+	NS	NS
LAKES	+	NS	-	NS	+	NS	+	NS	+	+	+	NS
PLAINS	+	+	NS	NS	+	+	+	NS	++	+	+	NS
SEAST	NS	NS	-	-	NS	NS	+	NS	+	+	+	+
SWEST	++	NS	-	-	NS	NS	NS	...	NS	NS	NS	NS
* MLR^2	.302	.264	.343	.251	.344	.303	.376	.333	.289	.291	.283	.271

* MLR^2 = Amount of Variance explained in the Reduced Form Achievement Equation (OLS) with all the variables listed in Tables III.1-5 included.

Table III.6.

COMPARISON OF NUMBER OF SIGNIFICANT HOME AND SCHOOL VARIABLES ACROSS GROUPS

	HOME *		SCHOOL **	
	Number of Significant Variables in Table III.1.		Number of Significant Variables in Tables III.2-4.	
	9th Grade	12th Grade	9th Grade	12th Grade
Black	12	11	9	12
White	10	13	11	8
Native American	6	7	8	12
Oriental	10	9	6	10
Puerto Rican	13	10	8	13
Mexican American	11	12	12	10

* Sum of Significant variables in Table III.1.

** Sum of Significant variables in Tables III.2.-4.

SECTION IV

A SIMULTANEOUS EQUATIONS MODEL OF THE EDUCATIONAL PROCESS RESTRUCTURED: Emphasizing the Role of College Preparatory Programs, Self Esteem, and the Ability to Control One's Environment

by

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A SIMULTANEOUS EQUATIONS MODEL OF THE EDUCATIONAL PROCESS RESTRUCTURED: Emphasizing the Role of College Preparatory Programs, Self Esteem, and the Ability to Control One's Environment*

Introduction

In this paper, we develop and estimate a simultaneous equation model of the educational process. Currently, the literature contains some simultaneous equations models estimated by Levin (1970), Michelson (1970), Gordon (1973), Parti and Adelman (1974), Anderson and Evans (1974), Boardman (1974), and Boardman et al. (1972, 1973). This paper is an extension of the above referenced works.

Our model contains nine, observed endogenous variables and forty eight exogenous variables. The observed endogenous variables are pupil achievment, participation in a college preparatory program, the need for achievement or aspirations, demonstrated motivation or studiousness, expectations, self esteem, belief in the ability to control one's environment, pupil's perceived parents' expectations, and pupil's perceived teachers' expectations. The set of exogenous variables contains measures of 1) pupil demographics, such as sex, ethnic group, and age, 2) family background characteristics, such as, socio-economic status, information in the home, family structure, order of birth, and reading before school, 3) stability characteristics, such as number of times and the last time the pupil changed school, 4) school peer group characteristics, such as, the racial composition of the school and classroom and the average socio-economic background level of the students, 5) teacher characteristics, such as, the average achievement level of the teachers, teachers' experience, and the number of teachers per pupil, and 6) school characteristics, such as, school facilities, problems in the school, and school age.

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Stated quite generally, we intend to investigate the relationships among the endogenous variables and to consider the effects of the exogenous variables on the endogenous variables.[1] We shall emphasize the role of the college preparatory program: the characteristics of students in the program and the apparent consequences of presence in the program. None of the studies referenced above considers the college preparatory program. In our previous work, we treated self esteem and belief in the ability to control one's environment as one variable called efficacy. In this paper we consider the two attitudes separately. Thus, we may determine which variable seems most important for improving achievement. Another problem with our previous work was that we included the need for achievement and demonstrated motivation in a single motivational variable. Psychologists emphasize the role of the need for achievement. In this paper, we consider whether this variable seems more important than demonstrated motivation. Due to limited space, combined with insufficient interest, we exclude the results for two estimated equations: the ones where perceived parents' expectations and perceived teachers' expectations are the regressands.

Among the exogenous variables, we shall consider some manipulable variables, in particular, pupil composition of the school, and school and teacher characteristics. Also, we shall consider ethnic group and sex differences.

Our data come from the survey for Equality of Educational Opportunity, which many people call the Coleman report. We estimate the model by two stage least squares. Appendix A contains the variables' descriptions. The results appear in Appendix B.

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[1] Basically, this work is exploratory. We estimate many structures but present only the ones which seem intuitively, theoretically, and statistically superior. We believe that it is worthwhile discussing the implications of the results. Of course, in such models, we can never show causation.

2. Outputs of the Educational Process

Many empirical papers treat pupil achievement as the exclusive educational output. Indeed achievement is one of the major outputs. At least, children should be able to read, to write, to understand and use mathematics, and possess some general knowledge. While it is quite easy to define achievement for a particular subject area, it is surprisingly difficult to come up with a definition of achievement which covers all areas. Instead of thinking up our own definition, we use the following definition from the Equalty of Educational Opportunity report, the EEOR.[2] The Educational Testing Service, ETS, which administered the surveys for the EEOR aimed to "...measure those skills which are most important in our society for getting a good job and moving to a better one, and for full participation in an increasingly technical world." (p. 20).

Achievement is an overemphasized output of the educational process. While achievement in school must bear some relationship to future, occupational success, the evidence has failed to show a strong relationship. Among others, Jencks (1972) downplays the role of school achievement in later life. Since achievement is not all - important, let us consider other outputs which the school may affect.

Cognitive psychologists emphasize the role of desires, aspirations, and the need for achievement. Certainly, inherent motivation affects how hard a person tries for success. Ceterius Paribus, greater effort will produce more results. So, some motivational variables are important outputs. It is important to distinguish between motivation and other variables related to the self. For our purposes anything that a person expresses in terms of a *want* is a motivational variable.

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[2] The reader should compare the following definitions with the operational definitions which appear in Appendix A.

Some important outputs are variables that reflect what a person thinks about himself, his ability to determine what happens to him, and what he expects will happen to him. These variables include self confidence, a number of self concepts, self esteem, belief in the ability to control one's environment or internal vs. external control, and occupational expectations. In this paper, we exclude self confidence and self concepts.[3] We include self esteem and we adopt the following definition by Coopersmith (1967):

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[3] Considerable confusion surrounds the use of the words "self esteem" and "self concept." Often, these terms are misused. The self concept is really an array of attributes. It consists of a set of cognitions about onself, such as, "I play baseball." Additionally, the self concept usually includes self identities, such as, "I am a white, anglo saxon American." Self esteem refers to feelings of self worth. It consists of evaluations of oneself, such as, "I am able to do many things well." Unlike self concept, self esteem can be reduced to a single dimension. Note that the statement, "I am a good baseball player" reflects both self concept — "I do play baseball" and self esteem — "I am good at something." In this paper we exclude self concepts and self confidence because the role of these variables is not well formulated theoretically. Also, we have no measure of them.

> By self-esteem we refer to the evaluation which the individual makes and customarily maintains with regard to himself: it expresses an attitude of approval or disapproval, and indicates the extent to which the individual believes himself to be capable, successful, and worthy. In short, self-esteem is a personal judgement of worthiness that is expressed in the attitudes an individual holds toward himself. (pp. 4-5)

An attitude similar to self esteem is the belief in the ability to control one's environment. Rotter (1954) and Rotter, Seeman, and Liverant (1962) introduced this concept in social learning theory. Rotter et al. distinguished between internal and external control. A person with internal control believes that he has control over his environment while a person with external control believes that he has no control over his environment, and that his experiences result from luck or fate.

Clearly, we have left out some other important affective variables. Also, we exclude variables that reflect the psychic character of students. For example, we have no measures of emotional stability or maturity, which are important outputs and are influenced by the school environment.

Another related omission concerns moral development and value clarification. Recently, Lawrence Kohlberg, a philosopher and psychologist, and Edwin Fenton, an historian and educator, have devoted considerable attention to the way in which the school and school textbooks can develop morals and clarify values. Of course, such outputs are difficult to measure in any circumstances, and we certainly have no measure of them.

There are many educational outputs. We have defined some of them, and we have alluded to others. We mention these outputs in order to place our work in some context, and to realize what we have left out.

3. A Model of the Educational Process

Clearly, some outputs of the educational process jointly determine each other. How well a pupil achieves will affect what he thinks about himself, particularly his self esteem. At the same time what a pupil thinks about himself may well contribute to future performance. If the time periods are small or if observations occur only once, we may consder these changes as simultaneous.[4] Some outputs, such as self esteem and belief in the ability to control the environment may be jointly determined, independent of time.

Postulating the relationships among the endogenous variables is a very difficult and challenging task. Some of the key outputs, such as, achievement, the need for achievement, self esteem, internal control, and expectations play central roles in theories of education, psychology, and sociology. However, nowhere do all these variables occur together in a single, unified theory. If, as a result of this work, we have some idea how these variables interact then we shall have made a step forward towards a more general theory than those which exist currently. These ambitions, however, do not help us formulate an initial model.

In order to formulate a model, we need to consider each endogenous variable in turn and shall discuss how we believe the other variables affect the regressand. Table I provides a succinct summary of our prior hypotheses. In this section we focus on the determinants of achievement.

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[4] See Bentzel and Hansen (1955)

One variable which we pay particular attention to is the role of the college preparatory program. College preparatory programs aim to provide students with more exposure to academic work than other programs. Thus, we should expect that participation in a college preparatory program will raise the achievement levels of students who are enrolled in such a program.

Now consider the motivational variables. Increasing the need for achievement can do nothing to decrease a student's academic achievement and may well increase it. As Weiner (1972) says:

> The main behavioral differences between individuals high and low in achievement needs are that individuals in the high motive group are more likely to initiate achievement activities; they work with greater intensity, persist longer in the face of failure, and choose more tasks of intermediate difficulty (instead of easy ones), than persons low in achievement needs. (p. 208)

The role of demonstrated motivation, however, is not so clear. Independent of ability, students who work harder will achieve more, but, in the absence of a control for ability, we may observe a negative correlation between achievement and demonstrated motivation.[5] Students with high ability (which results in high achievement) may feel they can work less hard than students with less ability. An exclusion restriction for demonstrated motivation seems reasonable.

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[5] Unfortunately, no test measures achievement independent of ability. At the same time no satisfactory test measures ability independent of achievement, though biologists may develop good measures of ability in the future. Since the model excludes ability, which must influence achievement, the achievement equation should be regarded as a semi-structural form equation.

Now consider expectations. Achievement and expectations probably correlate highly. Certainly, good performance provides a reason for high expectations. But a positive attitude towards the future as evidenced by high expectations may contribute to achievement. A self-fulfilling prophecy may exist. People with high expectations may more easily receive information because they may expect to be in a position to make use of it.

A considerable body of evidence suggests an interdependent relationship between achievement and self esteem. After reviewing much of the literature, Purkey (1970) concludes:

> ...A great deal of caution is needed before one assumes that either the self concept (self esteem) determines scholastic performance or that scholastic performance shapes the self concept (self esteem). It may be that the relationship between the two is caused by some factor yet to be determined. The best evidence now available suggests that this is a two-way street, and there is continuous interaction between the self and academic achievement, and that each directly influences the other.

For some reasons why self esteem should affect achievement consider these arguments by Shaftel *et al*. (1971):

> The child with an inadequate self-concept (self esteem) becomes defensive. Preoccupied with protecting himself against a threatening world, he is not free to explore new challenges nor is he open to problem-solving situations.

> Even though we teach him all the 'steps' in problem-solving, he may not be emotionally free to enter into the process intelligently. He is too busy with the 'unfinished business' of his previous situations. (p. 13)

Hershey and Lugo (1970) follow a similar line of reasoning whey they say, "Once a person feels safe and wanted, he is ready to learn and think more effectively. A positive self concept (self esteem) makes us more open and willing to accept new experiences." (p. 78)

Support for the notion that self esteem affects achievement comes also from the behavioural psychologists. In *Walden Two*, for example, Skinner (1948) argues implicitly that making people feel good about their achievements (improving their self esteem) will improve performance. (see esp. pp. 250-60).

To consider the effect of belief in the ability to control one's environment (internal control) on achievement, we turn to a different literature. Gozali *et al* (1973) summarize some previous work:

> There is some evidence that internals, as compared with externals, more actively seek information relevant to problem solving (Davis and Phares (1967)), tend to retain more information when this information is relevant to personal goals (Seeman (1963); Seeman and Evans (1962)), and tend to better utilize information that has been equivalently acquired and retained by internals and externals (Phares (1968)).

The remaining endogenous variables, perceived parents' expectations and perceived teachers' expectations may also have a positive influence on achievement. Here we have little good theory to draw upon, but we have no reason to suppose that these variables have a negative influence on achievement. Thus, we constrain them to have non-negative coefficients.

To consider each of the exogenous variables in turn would consume too much space. As shown in Table I, we impose few constraints on the coefficients of the exogenous variables. We would hope that all of the variables that reflect good teachers, such as, teachers' average verbal right and teachers' experience would have positive coefficients in the achievement equation. Notice that we include the average socio-economic composition of the school. This variable serves two purposes. First, it reflects the peer group composition. Second, it reduces spurious, self selection effects. Better teachers may obtain the privilege to choose the school in which they teach within a particular region. In general, better teachers will choose the better schools. Thus, teacher quality and school achievement may correlate. If, however, we include a variable that reflects school quality, i.e., a measure of attractiveness to teachers, such as the average pupil socio-economic background, then any observed teacher effects on achievement may be genuine, not spurious.

Exogenous variables that we emphasize are the ethnic variables and sex. As far as achievement is concerned, we may expect whites and Orientals to perform better than the other groups. For the sex variable, we may expect males to perform better than females. While females tend to do better in the earlier grades, many previous studies document that at the onset of puberty and after puberty, males perform better in school than females.

We now leave the determinants of achievement and move on to consider the other outputs. We could consider each of the other equations in detail, but this would consume too much space and the theory is more poorly formulated for these equations than for the achievement equation. In general, we assume that an endogenous variable can have only a positive, significant coefficient in any of the equations. If, during the estimations, a variable has an insignificant or a negative coefficient, we exclude this variable from the equation. Not all of the constraints require that an endogenous variable must have a significant, positive coefficient. For example, we postulate an exclusion restriction for demonstrated motivation in the achievement equation. Also, we allow expectations to take any sign in the demonstrated motivation equation. These constraints constitute the basis for identification. If all the cells that include a "?" are changed to zero then the model satisfies the rank and order conditions for identification. As we have presented the model, identification is not guaranteed a priori. Each equation of the estimated model turns out to be over identified many times over. The following key explains the notation in Table I.

4. Results

The results appear in Appendix B. For each equation the first column contains the reduced form equation, and the second column contains the structural form equation, estimated by two stage least squares. We obtained the two stage least squares equations by imposing the constraints in Table I.[6] Estimation proceeds recursively. Sometimes, we converge to two different

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[6] Sometimes the second column includes a variable with a t-statistic which is a little less than 1.645 in absolute value. Sometimes a few variables are on the borderline. One can take one variable out, and another becomes significant. One can go in circles without really improving the model at all.

KEY TO TABLE I A PRIORI MODEL OF THE EDUCATIONAL PROCESS

Symbol	Explanation
++	variable must have a positive, significant coefficient (t-statistic greater than 1.645), and we expect it to be positive
++?	as per "++", but we expect a zero coefficient
+	no constraint, but we expect a positive coefficent
--	as per "++", but negative
--?	as per "++?", but negative
-	as per "+", but negative
00	variable is excluded a priori
0	no constraints, but variable probably has a zero coefficient
?	no constraint, but no prior information

TABLE I: A PRIORI MODEL OF THE EDUCATIONAL PROCESS

Regressand

Regressors	ACH	CPREP	NACH	DEMMOT	EXP	SELFEST	CONTRL	
ACH	1	++	++	?	++	++	++	
CPREP	++	1	++	?	++	++	++	
NACH	++	++	1	++	+	?	?	
DEMMOT	00	++	0	1	++	++?	+	
EXP	++	+	+	?	1	++	?	
SELFEST	++	++	0	?	++?	1	++	
CONTROL	++	++	0	++	++	++	1	
PPAEXP	++	++	++	++	++	++	++	
PTEXP	++	++	++	++	++?	+	0	
SEX	–	?	+	+	–	0	+	
AGE	–	–	?	?	–	0	–	
SES	+	+	–	–	+	+	+	
INFO	+	+	+	+	+	+	+	
TWOP	+	+	?	?	?	+	+	
NOBAS	–	–	?	?	?	?	–	
FL	?	?	?	?	?	+	+	
RBS	+	?	+	0	+	+	+	
PTAAT	++	0	+	+	+	0	?	
PTAS	—	0	–	–	?	0	?	
TC	?	0	+	?	–	0	?	
NTCHSCL	–	0	–	–	?	–	–	
LSTCHSCL	+	0	+	+	?	+	+	
AVSES	+	0	0	0	+	+	?	
PWPICLY	+	0	+	+	+	?	?	
PWPICLY2	–	0	–	–	–	?	?	

Table I Continued

	Regressand							
Regressors	ACH	CPREP	NACH	DEMMOT	EXP	SELFEST	CONTRL	
PWHITE	+	0	+	+	+	?	?	
PWHITE2	–	0	–	–	–	?	?	
TAVR	+	0	+	0	+	+	+	
NTPRPUP	+	0	+	+	+	+	+	
TANYTCH	+	0	+	+	+	+	+	
PWTCHLY	+	0	+	+	+	?	+	
TASEX	+	0	?	?	?	?	?	
TPTC	+	0	?	?	?	?	?	
TPADTN	–	0	?	?	?	?	?	
FACILITS	+	0	+	?	+	+	+	
PROBLMES	–	0	–	?	–	–	0	
AGES	–	0	?	?	–	–	0	
PRPCPREP	00	++	00	00	00	00	00	
TEST	++	00	00	00	00	00	00	
NTCHLV	–	0	?	?	?	?	?	
PRNMADEG	+	0	?	?	+	?	?	
SMSA	+	0	?	?	?	+	+	
NEWENG	?	0	?	?	?	?	?	
MIDATL	?	0	?	?	?	?	?	
LAKES	?	0	?	?	?	?	?	
PLAINS	?	0	?	?	?	?	?	
SEAST	–	0	?	?	?	?	?	
SWEST	–	0	?	?	?	?	?	
NTLKGC	+	+	?	?	+	+	+	

Table I Continued

Regressand

Regressors	ACH	CPREP	NACH	DEMMOT	EXP	SELFEST	CONTRL
TV	–	–	–	–	0	0	0
CONST.	+	0	?	?	?	?	?
BLACK	–	?	+	+	?	+	0
WHITE	+	?	0	?	+	?	+
AMIND	–	?	?	?	?	?	0
ORIENT	+	?	?	+	+	–	0
PRICAN	–	?	?	?	?	?	0
MEXAM	–	?	?	?	?	?	0

equations. In such cases, an alternative equation appears in column three. The fourth column is a structural form equation estimated by ordinary least squares subject to some constraints in Table I. This equation is presented for comparison purposes and is rarely discussed further. All references to the reduced form apply to the first column. All references to the structure apply to the two stage least squares results in column two.

The estimated relationships among the endogenous variables is comprehended best by looking at Fig. 1. The lines with arrow heads indicate positive, significant regression coefficients, except for the one from expectations to demonstrated motivation, which indicates a significant, negative coefficient. The most striking feature is the complexity. At the same time one should note that not all of the endogenous variables interact with each other. Achievement, for example, appears to depend on only two endogenous variables: participation in a college preparatory program and belief in the ability to control one's environment. Achievement, itself, feeds back to four variables: self esteem, internal control, college preparatory program, and the need for achievement. So the lines are by no means all double headed.

As expected, achievement seems to depend on being in a college preparatory program and internal control. Interestingly, neither self esteem, the need for achievement, nor expectations seem to have independent, direct effects. In our original work, we treated self esteem and internal control as one variable. Some support for this convenience comes from the reasonably high correlation between these variables, which is evidenced by the high t-statistics for these variables in the fourth column equations for self esteem and internal control. However internal control has a relatively small

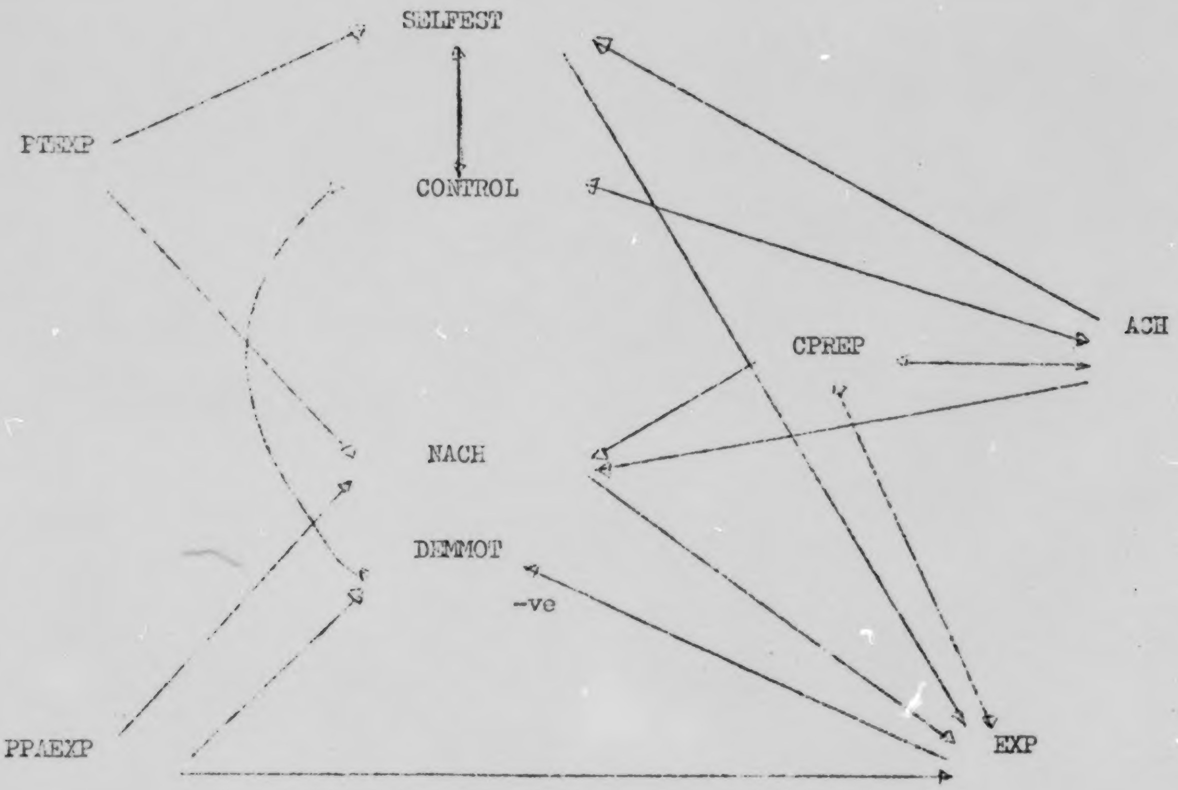
SELFEST
PTEXP
CONTROL
CPREP
ACH
NACH
DEMMOT
-ve
PPAEXP
EXP

Figure 1 : A graph of the relationships among the endogenous variables, except the determinants of perceived parents' and teachers' expectations.

t-statistic in the TSLS self esteem equation as does self esteem in the TSLS internal control equation. Also, Fig. 1 shows that these variables play quite different roles. For high achievement, control is the more important.

It is interesting to consider the motivational variables. Neither the need for achievement nor demonstrated motivation seem to affect many of the other endogenous variables. Surprisingly, they seem to have no relationship to each other. Also, these variables depend on many other endogenous variables, while they appear to influence few of the other outputs.

The major role of the college preparatory program is its apparent effect on achievement. Being in this program really does seem to improve achievement. At the same time one should note that a student must perform average or above in order to place in a college preparatory program. Participation in a college preparatory program appears also to raise expectations and the need for achievement.

Before leaving the discussion of the endogenous variables, it is worth mentioning that the imposed constraints in Table I are binding only for the achievement equation. In all other cases, an endogenous variable does not appear in the final tabulations because it had an insignificant coefficient when it was included in the equation. This result is quite surprising when one looks at the number of variables we excluded from the structural form equation that we estimated by ordinary least squares, because they violated the constraints in Table I.

5. Results for selected exogenous variables

Let us now consider the results for the exogenous variables. Unfortunately, we cannot summarize the results in a single diagram or table. To a great extent the results in Appendix B speak for themselves. Here we plan to concentrate on the apparent influences of some exogenous variables.

One variable which sometimes enters the equations with a large t-statistic is sex. The results show that in the twelfth grade males achieve higher scores than females. However, females are particularly well motivated; they have a high need for achievement and seem to work hard. Also, females believe they have much more control of their environment than males. Interestingly no significant sex differences exist in expectations, self-esteem, and participation in a college preparatory program.

Another variable which has comparatively large regression coefficeints and t-statistics is socio-economic background. Quite reqsonably, students with a high socio-economic background have high achievement, expectations, belief in their ability to control their environment, and are more likely to participate in a college preparatory program than students with a low socio-economic background. Motivational variables, however, seem to be higher for students with a low socio-economic background. Perhaps, disadvantaged students depend more on education as a path to mobility than do advantaged students. Thus, the student with a low socio-economic background has more at stake, which makes him want more and try more. Interestingly, self-esteem seems independent of socio-economic background.

The ethnic composition of the classroom and the school are variables which attract considerable attention. Many parents are concerned about the effects of bussing, on achievement in particular. Our results suggest no simple solution. The coefficients for the racial composition of the school variables suggest that a school which has neither a minority nor a majority of whites is the worst ethnic mix for high achievement. Thus, on average, integrated schools may have lower achievement levels than schools which are predominantly white or predominantly black. At the same time, one should note that schools with an ethnic mix may have students with a higher need for achievement, higher demonstrated motivation, higher expectations, and higher self esteem, than schools which are all white or all black. In short, the effects of integration appear extremely complex, and require much more thorough analysis of the individual ethnic groups, before we can make firm policy suggestions.

We are on much firmer grounds making policy suggestions about variables related to teacher characteristics and school characteristics. Teachers' average verbal ability level stands out as one variable that seems highly related to pupil achievement. While teachers' average verbal achievement has a negative coefficient in the college preparatory equation, its size in the achievement equation suggests clearly that improving the verbal (and presumably the other intellectual) abilities of teachers would be worthwhile. Teachers' experience seems positively related to pupil achievement, self esteem, internal control, demonstrated motivation, and expectations. While there may be few good, immediate substitutes for experience, more research should aim at identifying the advantageous nature of experienced teachers, which, once identified, may be taught to future or inexperienced teachers.

Another school characteristic with mainly positive, apparent influence is the number of teachers per pupil. Fewer teachers per pupil would increase pupil achievement and students' demonstrated motivation. It would be easy for school boards to improve the pupil teacher ratio. However, we have not, nor do we intend to do so here, estimated the cost-effectiveness of this proposal.

One school policy variable which enters all of the reduced form equations with positive coefficients is the proportion of students in a college preparatory program. These programs seem very productive. Allowing or encouraging more students to take these programs may have beneficial consequences for these additional students. While this action may lower the benefits of these programs to those students who are already enrolled in such programs, expansion of college preparatory programs seems a reasonable proposition, which should be studied more fully.

Finally, one should note that problems in the school seem to have negative effects on achievement, expectations, and the need for achievement. Schools function poorly when there are constant disruptions and schools should take effective action to reduce problems in the school.

6. A discussion of some ethnic differences

Appendix B shows clearly a wide divergence in the values of the endogenous variables among different ethnic groups. Historical and cultural experiences help to explain these ethnic differences. While we have not made an exhaustive historical and cultural study of each ethnic group we will highlight the experiences of two groups, the Orientals and the Puerto Ricans. These examples indicate how any final explanation of ethnic differences must include a detailed study of each ethnic group's culture and history. We selected the Orientals and Puerto Ricans because the former obtained consistently positive structural form coefficients and the latter obtained consistently negative structural form coefficients.

Orientals rank highest in achievement, college preparatory programs, demonstrated motivation, and expectations. The 1960 and 1963 census data indicated that Orientals possess more years of schooling than all other racial groups and had a median income only $99 less than the white mainstream which has a much higher income than blacks, Puerto Ricans, Indians, and Mexican Americans. (Levine & Montero, 1973, p. 35) The experience of Orientals in the United States contributes to their present position.[7] From the early twentieth century, Orientals enjoyed considerable economic and educational success. Immigrant Orientals arrived in the United States with developed entrepenurial skills and educational attainment. In 1900, approximately 84% of the Japanese came from prefectures in Japan where 51% of the men had at least eight years of education. (Levine & Montero, 1973, p. 40) None of the other groups we analyzed arrived with such educational baggage. Orientals enthusiastically sought admittance to the economic mainstream through education. Between 1900 and 1920 inability to speak English on the part of adult Japanese immigrants dropped from 62% to 15%; between 1920 and 1930 school attendance by Japanese Americans between the ages of 5 and 20 caught up and surpassed even the white native born. (Modell, (1974), p. 21)

Orientals initially entered the West Coast labor market either in agriculture, mining or railroad labor. However, discrimination and exclusion policies forced them to migrate to urban areas and to enter service related industries such as laundries, restaurants, hotels, and domestic service. While entry timing into the booming California labor market helped, Oriental businesses flourished due to their economic and social organization. Orientals formed partnerships and employed rotating credit associations to support new business enterprise. This entrepenurial organization did not prevail among other groups such as the blacks, who repeatedly formed solo entrepreneurships and started banks which soon failed. The Oriental family and clan promoted trade guilds which organized locations of Oriental business to prevent undue competition. Seattle, Washington, exemplified the enormous early economic success of Orientals, where, in 1919, Japanese owned 47% of hotels and 24% of grocery stores. By 1940, 40% of Japanese men in Los Angeles were self employed.[8] Economic success among Orientals continues to the present. This historical economic success justifies the observed high expectation coefficients for Orientals. They have come to expect success.

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[7] Often our Oriental examples represent research on the Japanese. We realize cultural differences exist between Japanese and Chinese. However, most of the pertinent research focuses on the Japanese and the Coleman data do not differentiate between Japanese and Chinese.

The family and clan not only contributed to economic success but also promoted high motivation and educational success among their children. As Light (1972) says "Oriental children are enjoined to study hard and achieve scholastic eminence in order to bring credit to their family and to their ethnic group." (p. 188) Circles of significant others praise and chastize Oriental youth in terms of impersonal achievements in school. However, while such evaluation of impersonal achievement promotes educational achievement and motivation, such evaluation does not necessarily promote individual self-esteem. Low self-esteem also finds its roots in the concentration camp experience of the 1940's which brought about a rejection of culture of the elder generation and led to a drive for assimilation into the white cultural mainstream.[9] We may note further that these experiences would hinder the development of a sense of control over one's environment.

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[8] See Light (1972) p. 8-10.

Finally, the high proportion of Orientals in college preparatory programs also possess cultural antecedents. Of second generation Japanese, 57% gained some college training and of third generation Japanese 88% gained college professional training.[10] Thus an historical and cultural sketch of Orientals parallels the magnitudes and signs of the structural form coefficients for Orientals.

The history of economic and educational attainments for Puerto Ricans are meager in comparison to Orientals and other racial groups. The 1960 census indicated that Puerto Ricans had a median income considerably less than whites, blacks, and other nonwhite groups (Fitzpatrick, 1971, pp. 59-60). Puerto Rican unemployment in 1960 averaged 9.9% whereas whites and blacks had 5% and 6.9% respective unemployment (Moynihan, 1970, p. 116). The 1960 census indicated low educational attainment; for example, in New York Puerto Ricans possessed less years of education than any other ethnic or racial group (Fitzpatrick, 1971, p. 136).

Unlike the Orientals, Puerto Ricans immigrated with little educational or entrepenurial-industrial skills. Three-fifths of the Puerto Rican immigrants could not speak English (Mills, 1950, p. 143). Most Puerto Ricans arrived in the 1940's and 1950's and received unskilled and semi-skilled jobs. More Puerto Rican migrants were women than men which forced them into an even lower position in the market structure. Earlier immigrant groups already

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[9] See Modell (1974) p. 29.

[10] See Levine and Montro (1973) pp. 44-45.

dominated service-related industries in cities. Two-thirds of the immigrant Puerto Ricans were, by mainland standards, black, and faced similar segregation and discrimination as did the urban black migrant. (Mills, 1950, p. 90) Puerto Ricans and blacks received the discriminatory position that Orientals held earlier.

A heritage of low economic achievement may explain Puerto Ricans' low achievement, need for achievement, and motivation. However, this external low economic position appears not to have lessened Puerto Ricans' expectations. One possible explanation for the high observed expectations lies within the Puerto Rican value system.

The basic value of Puerto Rican culture consists of a form of individualism unlike the United States' individualism based on competition and attainment of external economic and social status. (Fitzpatrick, (1971), p. 90) Puerto Ricans immigrated from a two class society of little social mobility in which expectations centered around the acquisition of respect in one's ascribed economic position. Until recently employment opportunities in the United States far surpassed opportunities in Puerto Rico. Thus, when Puerto Ricans come to the United States they may have unreasonably high expectations. This Puerto Rican emphasis on the inner qualities and respect in assigned social position may also explain the insignificant coefficient for Puerto Ricans in the self esteem equation. Even though a Puerto Rican may hold externally a low economic position, peer group respect may promote individual self esteem.[11]

Whereas the Oriental family and peer group values external status acquired through education and economic attainment, the Puerto Rican family and peer group values internal status acquired through personal dignity and respect. This fact combined with Puerto Rican reliance on a family network rather than the prevailing organized economic system reliance of the white mainstream account for low control of the environment.

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[11] The white perception of Puerto Ricans as blacks which reinforces ethnic identity may also, in turn, promote an individual ethnic self-esteem.

Puerto Rico fatalism leads to an acceptance of many events as inevitable, and lessens both the belief in their ability to control their environment and their sense of personal guilt for failure. (Fitzpatrick (1971), p. 92) Also, both fatalism and Catholicism may lower the need for achievement of Puerto Ricans. As Rosen (1969) indicates, the need for achievement is significantly lower for Catholics than for Protestants, Greek Orthodox, and Jews. (p.139)

7. Conclusion

Our analyses have shown that the educational process has multiple, interrelated outputs. Belief in the ability to control one's environment and participation in a college preparatory program seem to exert important influences on achievement. Self esteem and internal control seem to play quite different roles, although they correlate highly with each other. The pupil's need of achievement seems influenced by many of the endogenous variables, but it affects only expectations.

We have shown that variables associated with the school, such as the racial composition of the classrooms, teachers' ability, teachers' experience, the number of teachers per pupil, and problems in the school all seem to have important effects on the endogenous variables. Improving the quality of the teachers in the school will apparently have major beneficial effects on school outputs. We can offer no clear cut policies about the otpimal racial composition. In order to suggest policies on this issue, one should consider the ethnic groups individually. Some results appear in Boardman (1974), but this work treats self esteem and belief in the ability to control the environment as one variable; it treats the need for achievement and demonstrated motivation as one variable, and it excludes participation in a college preparatory program. Next, we plan to estimate a model using the ninth grade data.

APPENDIX A: VARIABLES' DESCRIPTION

Variable Name	Mean	Standard Deviation	Description
Endogenous Variables:			
ACH	0.322	3.657	Achievement; an index constructed from the number of correct verbal, general informational, reading, nonverbal and mathematical answers ($\alpha \simeq 0.91$)[1]
CPREP	0.378	0.485	College preparatory program; in a college preparatory program = 1, otherwise (general or vocational) = 0.
NACH	0.022	1.608	Need for achievement; an index constructed from how far the pupil wants to go in school, how good the student wants to be in school, how happy to quit school ($\alpha \simeq 0.56$)
DEMMOT	0.011	1.594	Demonstrated motivation; an index constructed from number of hours study and how often pupil stays away because he doesn't want to come ($\alpha \simeq 0.40$)
EXP	0.071	1.677	Expectations; an index constructed from occupational expectations and plans about college ($\alpha \simeq 0.56$)

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[1] All indices come from the first component of a principal components analysis. The indices correlate positively with each other. The variables appear in the same order as the magnitude of the absolute value of their loadings. Thus, verbal right loads higher than general informational right which, in turn, loads higher than reading right, etc. The number in parentheses equals approximately coefficient α. See Cronbach (1951).

Variable Name	Mean	Standard Deviation	Description
SELFEST	0.045	2.075	Self esteem; an index constructed from sometimes student feels he cannot learn, teachers go too fast, would change to be someone different, able to do many things well, assessment of own ability ($\alpha \simeq 0.65$)
CONTROL	0.054	1.552	Internal control or belief in the ability to control one's environment; an index constructed from good luck is more important than hard work for success, everytime get ahead something stops me, whatever education hard to get job ($\alpha \simeq 0.59$)
PPAEXP	0.052	2.340	Perceived parents' expectations; an index construction from education mother wants student to have, education father wants student to have, how well father wants student to do in class, and how well mother wants student to do in class ($\alpha \simeq 0.76$)
PTEXP	-4.265	1.609	Perceived teachers' expectations; teachers expect student to be one of the best in class = -2,...., good enough to get by = -8.
SEX	2.999	0.993	Sex; male = 2, female = 4
AGE	4.047	0.906	Age; less than 14 = 1,..., 20 or older = 7
SES	0.212	2.311	Socio-Economic Background; an index constructed from father's and mother's educational level, father's occupational level, encyclopedia in home, attended kindergarten school, number of people per room in the house, attended Nursery school, and number of hours work for pay ($\alpha \simeq 0.65$)

Variable Name	Mean	Standard Deviation	Description
INFO	0.131	1.744	Available Information in the Home; an index constructed from number of books in home, daily newspaper in home, number of magazines in home, dictionary in home, and trips to library ($\alpha \simeq 0.54$)
TWOP	0.651	0.477	Two Parents; two parents alive and living at home = 1, otherwise = 0.
NOBAS	2.808	2.128	Number of Older Brothers and Sisters; none older = 1,...,8 or more older = 9.
FL	3.219	1.066	Foreign Language; frequently speak a foreign language out of school = 1,..., never speak a foreign language = 4.
RBS	2.411	1.201	Reading Before School; not read before going to school = 1,..., regularly read before going to school = 4.
PTAAT	1.707	1.025	Parents Attend PTA: parents not go to PTA = 1,..., parents go most of the time = 4.
PTAS	1.994	1.114	Parents Talk About School; parents talk about school once a day = 1,..., parents never or hardly ever talk about school = 4.
TC	0.758	0.428	This City; spent most of life in this city or town = 1, otherwise = 0.
NTCHSCL	2.588	1.525	Number of Times Changed School; never changed school = 1,...,changed school four or more times = 5.

Variable Name	Mean	Standard Deviation	Description
LSTCHSCL	6.005	1.656	Last Time Changed School; changed school within a year = 2,..., changed school five or more years ago = 7.
AVSES	0.2119	1.035	Average Socio-Economic Background.
PWPICLY	3.209	1.455	Proportion of White Students in Class Last Year; no whites = 1,..., all white = 5.
PWPICLY2	12.416	8.801	PWPICLY**2
PWHITE	7.024	4.041	Proportion of white students in the school; no white = 1,..., all white = 12.
PWHITE2	65.666	51.811	PWHITE**2
TAVR	24.522	2.202	Teachers' Average Verbal Right; teachers' average verbal right for all teachers in the school.
NTPRPUP	0.043	0.008	Number of Teachers Per Pupil.
TANYTCH	4.448	0.676	Teachers' Average Number of Years Teaching; No years teaching = 1,..., 30 or more years = 8.
PWTCHLY	3.702	1.608	Proportion of White Teachers Last Year; no white teachers = 1,..., all white teachers = 5.
TASEX	2.922	0.275	Teachers' Sex; all males = 2,..., all females = 4.
TPTC	0.431	0.248	Proportion of Teachers from This City; all from this city = 1,...,none from this city = 0.
TPADTN	0.114	0.145	Teachers' Problems with Administration; lack of effective leadership = 1, ..., no problem = 0.

Variable Name	Mean	Standard Deviation	Description
FACILITS	12.526	1.643	School Facilities; a combination of principal's responses about library, auditorium, gymnasium, laboratories, etc.
PROBLEMS	167.84	2.339	Problems in the school; a combination of principal's responses about problems of damage, discourtesy and violence to teachers, racial tension, stealing, drugs, and drink (high value means many problems)
AGES	4.790	1.737	Age of school; main classroom less than one year old = 1,..., more than 39 years old = 7.
PRPCPREP	0.378	0.144	Proportion of students in College preparatory program
TEST	1.730	0.465	Test; school gives intelligence tests and standardized achievement tests = 2, school gives intelligence or standard achievement tests = 1, otherwise = 0.
NTCHLV	2.151	1.381	Number of Teachers who Leave; less than 5% left = 1,..., more than 50% left = 7.
PRNMADEG	4.211	0.633	Principal has M.A. Degree; no degree = 1,..., Doctorate = 6.
SMSA	1.304	0.460	Standard Metropolitan Statistical Area; within metropolitan area = 1, otherwise = 2.
NEWENG	0.030	0.170	New England; New England States = 1, otherwise = 0.

Variable Name	Mean	Standard Deviation	Description
MIDATL	0.215	0.411	Mid Atlantic; Mid Atlantic States = 1, otherwise = 0.
LAKES	0.155	0.362	Great Lakes; Great Lakes States = 1, otherwise = 0.
PLAINS	0.039	0.194	Plains; Plains States = 1, otherwise = 0.
SEAST	0.205	0.404	Southeast; South Eastern States = 1, otherwise = 0.
SWEST	0.091	0.287	Southwest; South Western States = 1, otherwise = 0. (Farwest excluded)
NTLKGC	2.586	1.255	Number of Times Talk to Guidance Counselor; not once = 1,..., six or more times = 5.
NHWTV	3.990	2.109	Number of Hours Watch T.V.; not watch T.V. = 1,..., 4 or more hours a day = 7.
CONST	1.000	0.000	Constant
BLACK	0.263	0.440	Black; Black = 1, otherwise = 0.
WHITE	0.290	0.454	White; White = 1; otherwise = 0.
AMIND	0.062	0.241	American Indian; Native American = 1; otherwise = 0.
ORIENT	0.088	0.284	Oriental; Oriental = 1, otherwise = 0.
PRICAN	0.075	0.264	Puerto Rican; Puerto Rican = 1, otherwise = 0.
MEXAM	0.149	0.356	Mexican American; Mexican American = 1, otherwise = 0.
			(Students who fail to put themselves in any one of the above categories constitute the excluded category)

Coefficients of Determination:

ABBREVIATION	DESCRIPTION
MLR2	This is the R^2 based on the TSLS, estimated structural form coefficients and the actual values of the endogenous variables.
R2	This is the R^2 based on the TSLS, estimated structural form coefficients and the predicted values of the endogenous variables.

APPENDIX B

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE ACHIEVEMENT EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
CPREP		1.881 (9.758)		1.749 (33.779)
NACH				0.210 (11.366)
DEMMOT				
EXP			0.168 (1.766)	0.081 (4.870)
SELFEST				0.205 (16.460)
CONTROL		0.963 (11.118)	1.236 (8.749)	0.298 (18.266)
PPAEXP				0.107 (8.928)
PTEXP				0.093 (6.637)
SEX	-0.214 (-9.077)	-0.325 (-11.924)	-0.400 (-10.822)	-0.171 (-8.286)
AGE	-0.337 (-12.422)	-0.148 (-5.427)	-0.147 (-4.988)	-0.148 (-6.335)
SES	0.251 (18.523)	0.097 (6.347)	0.144 (7.295)	0.066 (5.512)
INFO	0.151 (8.969)			0.001 (0.097)
TWOP	0.163 (3.118)			0.083 (1.360)
NOBAS	-0.106 (-9.092)	-0.046 (-4.081)	-0.043 (-3.482)	-0.063 (-6.302)
FL	-0.133 (-5.304)	-0.042 (-1.719)	-0.104 (-3.635)	0.008 (0.393)
RBS	0.101 (4.724)			-0.002 (-0.113)
PTAAT	-0.128 (-5.212)			-0.186 (-7.927)
PTAS	0.132 (5.793)			0.224 (11.360)
TC	0.103 (1.729)			0.075 (1.467)
NTCHSCL	0.015 (0.848)	0.058 (3.584)	0.053 (2.995)	0.034 (2.241)
LSTCHSCL	0.117 (7.260)	0.066 (4.314)	0.054 (3.183)	0.060 (4.338)
AVSES	0.120 (3.154)	0.314 (10.889)	0.325 (10.100)	0.334 (10.215)
PWPICLY	-0.279 (-2.220)		-0.058 (-2.096)	0.060 (0.555)
PWPICLY2	0.042 (2.180)			-0.011 (-0.673)

ACHIEVEMENT EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
PWHITE	-0.038 (-0.802)	-0.093 (-2.439)	-0.138 (-3.345)	-0.092 (-2.279)
PWHITE2	0.011 (3.044)	0.014 (4.763)	0.018 (5.717)	0.015 (4.919)
TAVR	0.188 (9.871)	0.172 (10.815)	0.179 (10.014)	0.205 (12.556)
NTPRPUP	11.930 (3.167)	11.877 (3.712)	13.459 (3.990)	13.530 (4.201)
TANYTCH	0.154 (3.570)	0.069 (1.947)	0.061 (1.580)	0.071 (1.935)
PWTCHLY	0.063 (2.416)			0.012 (0.528)
TASEX	0.087 (0.831)			0.059 (0.661)
TPTC	0.025 (0.173)			0.024 (0.195)
TPADTN	0.875 (5.050)	0.675 (4.365)	0.782 (4.619)	0.857 (5.782)
FACILITS	-0.046 (-2.854)			-0.020 (-1.448)
PROBLEMS	-0.033 (-2.935)	-0.025 (-8.197)	-0.018 (-5.116)	-0.036 (-3.803)
AGES	-0.020 (-1.196)			-0.015 (-1.049)
PRPCPREP	2.137 (10.178)			-0.195 (-1.054)
TEST	0.208 (3.468)	0.246 (4.736)	0.256 (4.656)	0.297 (5.790)
NTCHLV	0.080 (4.066)	0.049 (2.814)	0.043 (2.277)	0.048 (2.884)
PRNMADEG	-0.174 (-4.399)	-0.175 (-4.831)	-0.156 (-3.881)	-0.223 (-6.585)
SMSA	0.080 (1.132)			0.024 (0.401)
NEWENG	-0.311 (-1.952)			-0.095 (-0.694)
MIDATL	-0.220 (-2.281)	-0.153 (-2.343)		-0.199 (-2.403)
LAKES	-0.092 (-1.065)			-0.045 (-0.610)
PLAINS	0.363 (2.674)	0.199 (1.680)	0.226 (1.774)	0.248 (2.138)
SEAST	-0.372 (-3.345)	-0.401 (-5.220)	-0.342 (-4.146)	-0.520 (-5.461)
SWEST	-0.166 (-1.536)	-0.311 (-3.663)	-0.357 (-3.932)	-0.443 (-4.779)
NTLKGC	0.222 (11.306)			-0.001 (-0.045)

ACHIEVEMENT EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS	Structural Form (OLS)
TV	-0.063 (-5.664)		-0.029 (-2.460)	0.018 (1.871)
CONST.	0.355 (0.177)			0.793 (0.461)
BLACK	-0.473 (-4.426)	-0.772 (-8.079)	-0.750 (-7.153)	-0.838 (-9.144)
WHITE	1.277 (11.980)	0.642 (6.057)	0.618 (4.957)	0.875 (9.588)
AMIND	-0.202 (-1.532)	-0.398 (-3.319)	-0.374 (-2.872)	-0.300 (-2.669)
ORIENT	1.477 (12.101)	0.921 (8.127)	1.088 (8.958)	0.966 (9.220)
PRICAN	-0.617 (-4.867)	-0.640 (-5.555)	-0.694 (-5.574)	-0.558 (-5.152)
MEXAM	-0.734 (-6.711)	-0.764 (-7.663)	-0.787 (-7.177)	-0.633 (-6.771)
R2	0.4058	0.4022	0.3998	0.5662
MLR2	0.4058	0.5529	0.5253	0.5662

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OR VARIABLES IN THE COLLEGE PREPARATORY EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
ACH		0.036 (8.292)		0.039 (33.449)
NACH				0.025 (9.182)
DEMMOT				0.003 (3.729)
EXP		0.134 (15.370)		0.075 (31.563)
SELFEST				
CONTROL				
PPAEXP				0.017 (9.059)
PTEXP				-0.0003 (-0.153)
SEX	-0.021 (-5.960)			-0.003 (-1.003)
AGE	-0.033 (-7.975)			-0.003 (-0.920)
SES	0.049 (23.675)	0.017 (6.357)		0.019 (10.531)
INFO	0.024 (9.420)			0.0003 (0.137)
TWOP	0.014 (1.764)			-0.002 (-0.327)
NOBAS	-0.007 (-4.231)			0.001 (0.586)
FL	-0.044 (-11.666)	-0.020 (-5.949)		-0.023 (-7.064)
RBS	0.008 (2.458)			-0.005 (-1.678)
PTAAT	0.008 (2.101)			0.003 (0.968)
PTAS	-0.006 (-1.714)			0.005 (1.995)
TC	-0.0003 (-0.037)			-0.0004 (-0.047)
NTCHSCL	-0.008 (-2.921)	-0.006 (-2.456)		-0.007 (-2.893)
ISTCHSCL	0.003 (1.149)	-0.006 (-2.850)		-0.006 (-3.755)
AVSES	-0.071 (-12.246)	-0.064 (-12.810)		-0.063 (-12.738)
PWPICLY	-0.049 (-2.553)	0.006 (1.457)		-0.009 (-0.551)
PWPICLY2	0.008 (2.661)			0.002 (0.768)

COLLEGE PREPARATORY EQUATIONS(continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
PWHITE	0.008 (1.152)	-0.003 (-2.176)		0.003 (0.481)
PWHITE2	-0.001 (-1.013)			-0.0004 (-0.803)
TAVR	-0.001 (- 0.241)	-0.005 (-1.974)		-0.003 (-1.320)
NTPRPUP	-0.047 (-0.082)			-0.285 (-0.579)
TANYTCH	0.002 (0.374)	-0.014 (-2.792)		-0.012 (-2.048)
PWTCHLY	-0.001 (-0.315)	-0.007 (-2.031)		-0.010 (-2.896)
TASEX	-0.003 (-0.211)	-0.025 (-1.885)		-0.018 (-1.354)
TPTC	-0.021 (-0.973)			-0.032 (-1.682)
TPADMN	0.002 (0.069)			-0.023 (-1.015)
FACILITS	-0.003 (-1.366)			0.0002 (0.112)
PROBLEMS	0.002 (0.892)	0.003 (7.113)		0.003 (2.359)
AGES	-0.001 (-0.425)			-0.001 (-0.232)
PRPCPREP	0.939 (29.565)	0.689 (23.418)		0.708 (25.686)
TEST	-0.007 (-0.733)			-0.002 (-0.263)
NTCHLV	0.003 (1.060)			-0.003 (-1.055)
PRNMADEG	0.008 (1.255)			0.007 (1.314)
SMSA	-0.006 (-0.579)	-0.010 (-1.195)		-0.010 (-1.140)
NEWENG	-0.003 (-0.125)	0.039 (2.023)		0.053 (2.555)
MIDATL	0.020 (1.342)	0.052 (5.541)		0.059 (4.649)
LAKES	0.018 (1.391)	0.046 (4.503)		0.049 (4.363)
PLAINS	0.016 (0.764)			0.012 (0.665)
SEAST	0.025 (1.496)	0.042 (3.681)		0.038 (2.597)
SWEST	0.033 (2.012)			0.011 (0.808)
NTLKGC	0.030 (10.093)			0.003 (1.057)

COLLEGE PREPARATORY EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
TV	-0.018 (-10.891)	-0.009 (-5.557)		-0.008 (-5.379)
CONST.	0.135 (0.444)			-0.094 (-0.357)
BLACK	0.051 (3.176)	0.032 (2.823)		-0.022 (-1.573)
WHITE	0.070 (4.316)			0.003 (0.242)
AMIND	0.036 (1.786)	0.023 (1.618)		0.027 (1.578)
ORIENT	0.155 (8.396)	0.043 (3.170)		0.048 (2.984)
PRICAN	-0.011 (-0.583)			0.011 (0.643)
MEXAM	-0.019 (-1.162)	0.022 (1.895)		0.023 (1.623)
R2	0.2266	0.2260		0.4261
MIR2	0.2266	0.4406		0.4261

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE NEED FOR ACHIEVEMENT EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
ACH		0.056 (3.427)		0.050 (13.904)
CPREP		0.295 (2.443)		0.223 (9.354)
DEMOT				0.210 (33.347)
EXP				0.213 (29.546)
SELFEST				0.023 (4.169)
CONTROL				-0.002 (-0.228)
PPAEXP		0.383 (12.721)		0.236 (47.507)
PTEXP		0.451 (7.566)		0.055 (8.783)
SEX	-0.024 (-2.086)	0.122 (9.015)		0.028 (2.978)
AGE	-0.141 (-10.497)			-0.028 (-2.721)
SES	0.100 (14.888)	-0.046 (-4.958)		-0.022 (-4.124)
INFO	0.148 (17.813)	0.024 (2.597)		0.032 (4.985)
TWOP	0.036 (1.399)	-0.071 (-2.723)		-0.071 (-3.562)
NOBAS	-0.029 (-4.948)			0.006 (1.372)
FL	-0.087 (-7.047)	0.021 (1.774)		0.007 (0.760)
RBS	0.073 (6.947)			0.014 (1.749)
PTAAT	0.040 (3.289)			-0.008 (-0.814)
PTAS	-0.135 (-12.024)			0.002 (0.171)
TC	0.048 (1.615)	0.041 (1.526)		0.030 (2.220)
NTCHSCL	0.013 (1.444)			0.029 (3.386)
ISTCHSCL	0.077 (9.615)	0.040 (5.515)		0.035 (5.649)
AVSES	-0.132 (-6.992)			-0.051 (-3.513)
PWPICLY	-0.164 (-2.634)	0.019 (3.551)		-0.016 (-0.335)
PWPICLY2	0.029 (2.970)	-0.025 (-3.059)		0.005 (0.668)

NEED FOR ACHIEVEMENT EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
PWHITE	0.005 (0.202)	-0.028 (-5.395)		-0.009 (-0.501)
PWHITE2	-0.003 (-1.599)			-0.001 (-0.754)
TAVR	-0.046 (-4.877)	-0.018 (-2.101)		-0.031 (-4.211)
NTPRPUP	-2.013 (-1.080)			-0.718 (-0.501)
TANYTCH	0.039 (1.836)			-0.023 (-1.410)
PWTCHLY	0.086 (6.605)	0.051 (4.126)		0.041 (4.128)
TASEX	0.028 (0.544)			-0.043 (-1.073)
TPTC	0.104 (1.444)			0.082 (1.476)
TPADTN	-0.049 (-0.569)			-0.031 (-0.466)
FACILITS	-0.008 (-0.967)			0.006 (0.927)
PROBLEMS	-0.004 (-0.730)	-0.008 (-1.588)		-0.005 (-1.075)
AGES	0.010 (1.185)	0.017 (2.472)		0.013 (2.014)
PRPCPREP	1.073 (10.322)			0.103 (1.251)
TEST	-0.145 (-4.909)			-0.057 (-2.404)
NTCHLV	0.024 (2.524)			0.012 (1.574)
PRNMADEG	0.043 (2.173)			0.026 (1.743)
SMSA	-0.018 (-0.508)			-0.041 (-1.541)
NEWENG	-0.383 (-4.860)			-0.161 (-2.661)
MIDATL	-0.176 (-3.684)			-0.044 (-1.209)
LAKES	-0.171 (-3.996)			-0.044 (-1.339)
PLAINS	-0.037 (-1.298)			-0.059 (-1.143)
SEAST	0.207 (3.756)	0.096 (2.435)		0.153 (3.605)
SWEST	0.375 (7.000)	0.135 (3.080)		0.193 (4.675)
NTLKGC	0.127 (13.092)			0.025 (3.275)

NEED FOR ACHIEVEMENT EQUATION (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS)	Structural Form (OLS)
TV	-0.076 (-13.694)	-0.016 (-2.804)		-0.023 (-5.482)
CONST.	1.532 (1.540)	2.493 (2.810)		1.334 (1.744)
BLACK	0.499 (9.440)	0.191 (4.683)		0.188 (4.609)
WHITE	0.199 (3.781)			0.039 (0.949)
AMIND	0.144 (2.219)	0.118 (2.352)		0.093 (1.860)
ORIENT	0.394 (6.528)	0.156 (3.031)		0.009 (0.193)
PRICAN	-0.069 (-1.107)			-0.044 (-0.903)
MEXAM	-0.071 (-1.316)	0.093 (2.399)		0.031 (0.755)
R2	0.2471	0.2465		0.5566
MIR2	0.2471	0.5952		0.5566

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE DEMONSTRATED MOTIVATION EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII(TSLS)	Structural Form (OLS)
ACH				-0.045 (-9.932)
CPREP				0.108 (3.604)
NACH				0.310 (33.823)
EXP		-0.360 (-4.968)		0.017 (1.838)
SELFEST				-0.023 (-3.309)
CONTROL		0.261 (4.515)		0.078 (8.494)
PPAEXP		0.622 (15.773)		
PTEXP				
SEX	0.266 (22.361)	0.388 (19.080)		0.254 (22.259)
AGE	-0.079 (-5.760)			-0.037 (-2.866)
SES	0.009 (1.266)	-0.088 (-7.825)		-0.021 (-3.228)
INFO	0.118 (14.006)	0.034 (2.768)		0.072 (8.866)
TWOP	0.120 (4.579)			0.110 (4.421)
NOBAS	-0.039 (-6.658)			-0.031 (-5.516)
FL	-0.033 (-2.596)			-0.006 (-0.515)
RBS	0.045 (4.201)			0.021 (2.102)
PTAAT	0.059 (4.758)	0.054 (3.182)		0.041 (3.486)
PTAS	-0.200 (-17.446)			-0.150 (-13.664)
TC	0.049 (1.638)			0.037 (1.284)
NTCHSCL	-0.026 (-2.889)	-0.029 (-2.595)		-0.026 (-3.020)
LSTCHSCL	0.072 (8.898)	0.046 (4.365)		0.050 (6.427)
AVSES	-0.056 (-2.934)			0.0003 (0.015)
PWPICLY	0.195 (3.087)	0.382 (6.216)		0.237 (3.937)
PWPICLY2	-0.020 (-2.078)	-0.050 (-5.188)		-0.028 (-3.028)

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE DEMONSTRATED MOTIVATION EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural Form II (TSLS)	Structural Form (OLS)
PWHITE	-0.039 (-1.643)	-0.033 (-5.244)		-0.042 (-1.870)
PWHITE2	-0.001 (-0.602)			0.0002 (0.146)
TAVR	-0.009 (-0.920)			0.012 (1.335)
NTPRPUP	0.040 (0.021)	4.670 (2.215)		1.292 (0.719)
TANYTCH	0.101 (4.642)	0.069 (2.780)		0.091 (4.431)
PWTCHLY	0.074 (5.595)			0.046 (3.656)
TASEX	0.057 (1.094)			0.050 (0.998)
TPTC	-0.026 (-0.348)			-0.060 (-0.862)
TPADTN	0.020 (0.234)			0.062 (0.752)
FACILITS	-0.015 (-1.871)			-0.014 (-1.855)
PROBLEMS	0.005 (0.917)			0.005 (0.899)
AGES	0.014 (1.624)	0.035 (3.589)		0.010 (1.269)
PRPCPREP	0.292 (2.769)			-0.078 (-0.761)
TEST	-0.138 (-4.584)			-0.082 (-2.880)
NTCHLV	-0.019 (-1.878)	-0.026 (-2.195)		-0.025 (-2.624)
PRNMADEG	-7.394 (-3.716)	-0.080 (-3.221)		-0.093 (-4.941)
SMSA	0.133 (3.753)	0.140 (3.828)		0.135 (4.022)
NEWENG	0.059 (0.738)	0.337 (3.698)		0.173 (2.274)
MIDATL	-0.083 (-1.717)			-0.027 (-0.579)
LAKES	-0.124 (-2.848)	-0.060 (-1.346)		-0.068 (-1.643)
PLAINS	-0.024 (-0.356)			0.011 (0.164)
SEAST	0.163 (2.912)			0.083 (1.564)
SWEST	0.193 (3.548)			0.059 (1.146)
NTLKGC	0.046 (4.618)			0,002 (0.251)

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE DEMONSTRATED MOTIVATION EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS)	Structural Form (OLS)
TV	-0.043 (-7.633)			-0.019 (-3.554)
CONST.	-1.866 (-1.847)	-2.374 (-9.549)		-2.198 (-2.292)
BLACK	0.484 (9.005)	0.138 (2.890)		0.293 (5.717)
WHITE	0.112 (2.084)			0.068 (1.326)
AMIND	0.039 (0.597)			-0.031 (-0.495)
ORIENT	0.534 (8.704)	0.367 (5.921)		0.429 (7.328)
PRICAN	0.012 (0.193)			0.003 (0.058)
MEXAM	0.062 (1.120)	0.099 (2.155)		0.050 (0.960)
R2	0.2092	0.2079		0.2885
MIR2	0.2092	0.2644		0.2885

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE EXPECTATIONS EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS)	Structural Form (OLS)
ACH				0.020 (5.048)
CPREP		0.820 (7.883)		0.822 (32.170)
NACH		0.163 (2.621)		0.260 (29.546)
DEMMOT				0.018 (2.525)
SELFEST		0.246 (4.425)		0.100 (16.290)
CONTROL				0.048 (5.928)
PPAEXP		0.153 (5.291)		0.089 (15.122)
PTEXP				0.021 (2.986)
SEX	-0.081 (-6.730)			-0.035 (-3.399)
AGE	-0.125 (-8.985)	-0.020 (-1.619)		-0.018 (-1.554)
SES	0.171 (24.648)	0.057 (7.148)		0.067 (11.332)
INFO	0.130 (15.100)	0.033 (3.801)		0.036 (4.956)
TWOP	0.047 (1.754)			-0.006 (-0.258)
NOBAS	-0.030 (-4.984)	-0.006 (-1.258)		-0.005 (-1.001)
FL	-0.142 (-11.068)	-0.053 (-4.691)		-0.059 (-5.556)
RBS	0.063 (5.792)			0.008 (0.843)
PTAAT	0.091 (7.273)	0.060 (5.598)		0.067 (6.519)
PTAS	-0.084 (-7.200)			-0.009 (-0.954)
TC	-0.070 (-2.280)	-0.083 (-3.225)		-0.091 (-3.601)
NTCHSCL	-0.026 (-2.772)	-0.025 (-3.412)		-0.022 (-2.897)
ISTCHSCL	0.038 (4.610)			0.0003 (0.041)
AVSES	-0.070 (-3.590)	0.055 (3.855)		0.048 (2.977)
PWPICLY	-0.275 (-4.263)	-0.034 (-3.036)		-0.098 (-1.848)
PWPICLY2	0.038 (3.782)			0.009 (1.132)

EXPECTATIONS EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS)	Structural Form (OLS)
PWHITE	0.092 (3.842)	0.043 (2.491)		0.072 (3.660)
PWHITE2	-0.006 (-3.534)	-0.003 (-2.063)		-0.004 (-2.968)
TAVR	-0.033 (-3.347)			-0.018 (-2.249)
NTPRPUP	-0.058 (-0.303)			0.048 (0.302)
TANYTCH	0.070 (3.182)	0.027 (1.685)		0.029 (1.611)
PWTCHLY	0.027 (1.981)			-0.011 (-0.963)
TASEX	0.105 (1.961)	0.067 (1.546)		0.083 (1.900)
TPTC	0.088 (1.178)			0.080 (1.303)
TPADTN	-0.073 (-0.826)			-0.076 (-1.048)
FACILITS	-0.018 (-2.234)			-0.006 (-0.885)
PROBLEMS	-0.010 (-1.761)	-0.012 (-2.647)		-0.011 (-2.344)
AGES	0.003 (0.298)			0.004 (0.546)
PRPCPREP	1.276 (11.862)			-0.008 (-0.084)
TEST	-0.057 (-1.868)			0.009 (0.364)
NTCHLV	0.026 (2.591)			0.009 (1.129)
PRNMADEG	0.076 (3.738)	0.003 (1.806)		0.050 (2.972)
SMSA	0.022 (0.622)			0.011 (0.380)
NEWENG	-0.327 (-4.004)	-0.119 (-1.874)		-0.156 (-2.331)
MIDATL	-0.283 (-5.724)	-0.252 (-7.549)		-0.247 (-6.093)
LAKES	-0.244 (-5.495)	-0.193 (-5.738)		-0.196 (-5.378)
PLAINS	-0.065 (-0.930)	-0.100 (-1.695)		-0.090 (-1.568)
SEAST	-0.095 (-1.669)	-0.161 (-4.320)		-0.197 (-4.212)
SWEST	0.132 (2.386)			-0.054 (-1.184)
NTLKGC	0.174 (17.296)	0.048 (3.506)		0.065 (7.671)

EXPECTATIONS EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII(TSLS)	Structural Form (OLS)
TV	-0.056 (-9.827)			-0.005 (-1.020)
CONST.	2.196 (2.133)	1.632 (2.010)		1.891 (2.236)
BLACK	0.260 (4.745)			0.004 (0.097)
WHITE	0.118 (2.154)	-0.063 (-1.711)		-0.054 (-1.873)
AMIND	0.140 (2.078)	0.107 (2.236)		0.083 (1.493)
ORIENT	0.378 (6.041)	0.154 (3.210)		0.063 (1.219)
PRICAN	0.048 (0.736)	0.103 (2.249)		0.099 (1.849)
MEXAM	-0.130 (-2.328)	-0.052 (-1.408)		-0.057 (-1.239)
R2	0.2587	0.2583		0.5014
MIR2	0.2587	0.5135		0.5014

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE SELF-ESTEEM EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII(TSLS)	Structural Form (OLS)
ACH		0.085 (4.863)		0.031 (15.883)
CPREP				
NACH				0.026 (2.434)
DENMOT				
EXP				0.161 (15.601)
CONTROL		0.144 (2.294)		0.542 (55.223)
PPAEXP				
PTEXP		0.967 (15.752)		0.250 (28.147)
SEX	-0.025 (-1.555)			-0.072 (-5.424)
AGE	-0.131 (-7.002)	0.030 (1.455)		0.190 (1.246)
SES	0.089 (9.522)			-0.007 (-0.897)
INFO	0.100 (8.676)			0.011 (1.106)
TWOP	0.010 (0.292)			-0.035 (-1.197)
NOBAS	-0.016 (-2.012)			0.021 (3.191)
FL	-0.062 (-3.595)			-0.011 (-0.751)
RBS	0.134 (9.130)	0.052 (3.204)		0.053 (4.413)
PTAAT	0.026 (1.541)			0.023 (1.676)
PTAS	-0.025 (-1.579)			-0.004 (-0.313)
TC	0.042 (1.030)			0.012 (0.345)
NTCHSCL	0.005 (3.905)			0.021 (2.060)
ISTCHSCL	0.051 (4.617)	0.014 (1.335)		-0.001 (-0.094)
AVSES	-0.093 (-3.563)			-0.042 (-1.969)
PWPICLY	-0.539 (-6.235)			-0.342 (-4.869)
PWPICLY2	0.080 (5.991)			0.049 (4.492)

SELF-ESTEEM EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS)	Structural Form (OLS)
PWHITE	0.137 (4.251)	0.094 (3.924)		0.116 (4.435)
PWHITE2	-0.009 (-3.551)	-0.006 (-3.118)		-0.008 (-4.029)
TAVR	-0.011 (-0.867)			-0.028 (-2.603)
NTPRPUP	-0.334 (-0.129)			-1.059 (-0.504)
TANYTCH	0.147 (4.958)	0.078 (2.887)		0.063 (2.636)
PWTCHLY	0.031 (1.706)			-0.015 (-1.038)
TASEX	0.009 (0.124)			-0.014 (-0.240)
TPTC	-0.083 (-0.829)	-0.278 (-3.199)		-0.159 (-1.950)
TPADTN	0.064 (0.538)	0.212 (1.833)		-0.040 (-0.412)
FACILITS	-0.050 (-4.581)	-0.023 (-2.212)		-0.030 (-3.348)
PROBLEMS	0.001 (0.180)			0.003 (0.539)
AGES	-0.006 (-0.535)			-0.002 (-0.191)
PRPCPREP	0.532 (3.686)			-0.115 (-0.975)
TEST	-0.039 (-0.941)			-0.011 (-0.341)
NTCHLV	0.031 (2.313)			-0.002 (-0.141)
PRNMADEG	0.072 (2.642)			0.072 (3.254)
SMSA	0.160 (3.312)	0.079 (1.810)		0.071 (1.800)
NEWENG	-0.051 (-0.462)			0.105 (1.184)
MIDATL	0.226 (3.407)	0.209 (4.355)		0.331 (6.148)
LAKES	0.069 (1.155)			0.149 (3.080)
PLAINS	0.329 (3.522)	0.172 (2.014)		0.196 (2.587)
SEAST	0.131 (1.708)			0.107 (1.728)
SWEST	0.151 (2.028)	-0.117 (-1.924)		0.010 (0.163)
NTLKGC	0.261 (19.336)	0.075 (4.342)		0.081 (7.278)

SELF-ESTEEM EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII(TSLS)	Structural Form (OLS)
TV	-0.051 (-6.640)			-0.016 (-2.525)
CONST.	-0.896 (-0.649)	3.228 (9.781)		1.064 (0.948)
BLACK	0.178 (2.424)	0.095 (1.974)		0.078 (1.302)
WHITE	0.322 (4.402)			-0.090 (-1.505)
AMIND	-0.175 (-1.942)	-0.187 (-2.695)		-0.219 (-2.987)
ORIENT	-0.027 (-0.324)	-0.228 (-3.208)		-0.382 (-5.572)
PRICAN	-0.106 (-1.213)			-0.038 (-0.536)
MEXAM	-0.101 (-1.341)			0.002 (0.032)
R2	0.1286	0.1275		0.4257
MIR2	0.1286	0.4341		0.4257

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN THE CONTROL OF THE ENVIRONMENT EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII(TSLS)	Structural Form (OLS)
ACH		0.117 (9.659)	0.150 (14.657)	0.071 (18.490)
CPREP				
NACH				-0.011 (-1.329)
DEMMOT		0.138 (4.614)	0.129 (4.504)	0.061 (8.477)
EXP				0.039 (4.996)
SELFEST		0.095 (2.094)		0.313 (55.286)
PPAEXP				
PTEXP			0.245 (9.164)	0.023 (3.275)
SEX	0.154 (13.130)	0.144 (10.276)	0.156 (10.526)	0.165 (16.108)
AGE	-0.129 (-9.520)	-0.066 (-4.715)	-0.043 (-3.072)	-0.053 (-4.570)
SES	0.056 (8.324)	0.017 (2.105)		0.003 (0.512)
INFO	0.061 (7.253)	0.016 (1.715)		0.006 (0.836)
TWOP	0.053 (2.044)			0.030 (1.350)
NOBAS	-0.041 (-7.120)	-0.023 (-3.989)	-0.021 (-3.690)	-0.025 (-5.129)
FL	0.004 (0.335)	0.030 (2.763)	0.046 (4.057)	0.041 (3.872)
RBS	0.083 (7.851)	0.052 (4.501)	0.046 (4.609)	0.028 (3.137)
PTAAT	-0.028 (-0.233)	-0.024 (-2.101)	-0.031 (-2.717)	-0.035 (-3.393)
PTAS	-0.007 (-0.657)			0.006 (0.599)
TC	0.059 (1.995)			0.039 (1.539)
NTCHSCL	-0.027 (-2.961)	-0.028 (-3.506)	-0.028 (-3.509)	-0.026 (-3.469)
LSTCHSCL	0.054 (6.697)	0.028 (3.472)	0.023 (2.966)	0.024 (3.476)
AVSES	-0.045 (-2.390)	-0.049 (-3.211)	-0.044 (-2.739)	-0.180 (-1.113)
PWPICLY	-0.071 (-1.125)	0.025 (2.052)	0.025 (1.943)	0.123 (2.305)
PWPICLY2	0.015 (1.594)			-0.014 (-1.662)

COEFFICIENTS AND t-STATISTICS, IN PARENTHESES, OF VARIABLES IN CONTROL OF THE ENVIRONMENT EQUATIONS

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII (TSLS)	Structural Form (CIS)
PWHITE	0.007 (0.293)			-0.035 (-1.762)
PWHITE2	0.0001 (0.068)			0.002 (1.590)
TAVR	0.027 (2.811)			0.019 (2.305)
NTPRPUP	-1.054 (-0.562)	-2.906 (-1.959)	-3.134 (-2.139)	-1.646 (-1.157)
TANYTCH	0.077 (3.614)	0.036 (2.039)		0.011 (0.579)
PWTCHLY	0.059 (4.541)	0.040 (3.783)	0.049 (4.334)	0.040 (3.625)
TASEX	0.021 (0.412)			0.006 (0.143)
TPTC	0.029 (0.392)			0.048 (0.781)
TPADTN	0.196 (2.273)			0.120 (1.534)
FACILITS	-0.013 (-1.682)			0.008 (1.144)
PROBLEMS	0.002 (0.381)			0.004 (0.835)
AGES	-0.006 (-0.740)			-0.004 (-0.512)
PRPCPREP	0.310 (2.961)			-0.072 (-0.806)
TEST	-0.005 (-0.153)			0.004 (0.175)
NTCHLV	0.025 (2.595)	0.016 (1.915)		0.010 (1.154)
PRNMADEG	-0.025 (-1.276)			-0.034 (-2.051)
SMSA	0.136 (3.894)	0.096 (3.288)	0.084 (3.136)	0.071 (2.376)
NEWENG	-0.057 (-0.724)			-0.011 (-0.165)
MIDATL	-0.054 (-1.122)			-0.094 (-2.292)
LAKES	-0.043 (-1.001)			-0.042 (-1.151)
PLAINS	0.195 (2.885)	0.136 (2.412)	0.133 (2.291)	0.068 (1.190)
SEAST	0.009 (0.157)			-0.015 (-0.314)
SWEST	0.099 (1.842)	0.086 (2.207)		0.045 (0.974)
NTLKGC	0.173 (17.712)	0.114 (7.594)	0.098 (10.079)	0.064 (7.569)

CONTROL OF THE ENVIRONMENT EQUATIONS (continued)

Variable Name	Reduced Form (OLS)	Structural Form (TSLS)	Structural FormII(TSLS)	Strucutral Form (OLS)
TV	-0.018 (-3.231)			0.007 (1.539)
CONST.	-2.535 (-2.533)	-1.155 (-6.812)		-2.143 (-2.516)
BLACK	0.113 (2.134)			0.055 (1.214)
WHITE	0.480 (9.051)	0.204 (5.002)	0.166 (4.400)	0.277 (6.102)
AMIND	0.084 (1.280)			0.148 (2.653)
ORIENT	0.325 (5.351)			0.186 (3.571)
PRICAN	0.006 (0.097)			0.082 (1.531)
MEXAM	0.030 (0.544)		0.089 (2.579)	0.117 (2.531)
R2	0.1820	0.1813	0.1809	0.4087
MIR2	0.1820	0.3033	0.3116	0.4087

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SECTION V

"The Process of Education for Twelfth Grade
Asian American Students," by
Anthony E. Boardman, Anne Lloyd, and Diana Wood,
revised and forthcoming in
Cross Reference: Journal of Public Policy and Multicultural Education

Abstract

The Process of Education for Twelfth Grade Asian American Students

We develop and estimate a simultaneous equations model of the educational process for Asian American students. The model contains nine endogenous variables (outputs): pupil achievement, participation in a college preparatory program, achievement motivation, demonstrated motivation, expectations, self esteem, belief in one's ability to control one's environment, perceived parents' expectations and perceived teachers' expectations. The model contains forty-one exogenous variables including measures of pupil demographics, family background, geographic stability, peer group characteristics, teachers' characteristics, and school characteristics. Using a sample of 1324 twelfth grade students from the _Equality of Educational Opportunity_ survey, we estimate the model by two stage least squares and present the reduced form and structural form equations.

Educational research on Asian Americans has focussed on the determinants of academic achievement for Japanese and Chinese Americans. While researchers have generally attributed the high academic achievement of these two groups to culturally derived educational attitudes they have not explicitly modeled these attitudes and achievement as determined jointly. In this paper we develop and estimate a simultaneous equations model of the educational process for Asian Americans in which educational attitudes and achievement are causally related.[1] In order to estimate this complex model we require the large sample base available only in the Equality of Educational Opportunity survey, EEOS, (Coleman et al., 1966). Unfortunately, these data include a number of distinct Asian American subgroups. While the differences between Japanese and Chinese Americans (the two largest groups) may be significant, we argue that Japanese and Chinese Americans have more in common with each other than either group has in common with another major group e.g., whites (Sue and Kirk, 1973).

The literature about Asian Americans stresses the importance of significant others for the transmission of values and the formation of student attitudes which, in turn, affect achievement. In school, the Asian American student represents the family and if he fails he will disgrace the family (Connor, 1974). His school performance is evaluated by a circle of significant others who either praise or shame the student in light of his impersonal school achievement (Light, 1972). Thus we may expect that significant others and the student's perception of the expectations of significant others will have important effects on the student's attitudes and achievement in school. Career expectations are rooted within a traditional culture that emphasizes conformity (Sue & Kirk, 1972). At the same time those students who possess traditional personality characteristics achieve highest (Onoda, 1976). While parents are stressed as significant others, teachers also assume this role. Asian America students identify with their teachers, believe what they say, strive to emulate them and fulfill their teachers' expectations (Kitano, 1969; Yamamoto & Namoru, 1974).

While Asian American students are enjoined to work hard and achieve at school, they are not encouraged to compete openly. The concept of enyro, the devaluation of self and deference to others, contrasts to both high personal and group achievement (Johnson et al., 1974). At home, parents traditionally discourage aggressiveness, competition, and quarreling among siblings and encourage familial interdependence (Sollenberger, 1968; Schwartz, 1971; Kriger & Kroes, 1972). Sollenberger (1968) finds that early child-rearing practices build a feeling of confidence and security which counteracts the frustrations of future discipline. Thus, the Asian American family experience is conducive to educational achievement.

This study seeks to identify the causal relationships among perceptions of significant others, student attitudes and achievement. For this research we postulate nine educational outputs, called endogenous variables: achievement, participation in a college preparatory program, achievement motivation, demonstrated motivation, expectations, self esteem, belief in one's ability to control one's environment, pupil's perceived parents' expectations and pupil's perceived teachers' expectations. At the same time we examine the effects of forty-one predetermined or exogenous variables on each of the endogenous variables. These include measures of pupil demographics, family background, geographic stability, peer group characteristics, teachers' characteristics, and school characteristics. Previous research has neither considered that the educational process of Asian Americans consists of multiple outputs nor controlled for so many explanatory variables. Thus, we believe that this paper explores new ground for those researchers interested in the education of Asian Americans.

Method

Subjects

Our Sample consists of 1324 twelfth grade Asian Americans from the Equality of Educational Opportunity (Coleman et al., 1966) survey, EEOS. We study only those students who attend schools that have a college preparatory program.

Procedures

This study contains nine outputs or endogenous variables. These variables are described in Table 1. Most of the outputs are indices. Each index is constructed from the first component of a principal components analysis. For each index, variables are listed in descending order of importance, those variables with the highest loading come first. Cronbach's (1951) α, in parenthesis, provides a measure of the lower bound to the "true reliability."

Table 1 about here

This study includes forty-one exogenous variables. These variables have been grouped into demographic and home background variables (Table 2), student composition variables (Table 3), teachers' characteristics (Table 4), school characteristics (Table 5), regional and other variables (Table 6). The descriptions that appear in these tables are sufficient.

Table 2 to Table 6 about here

Stated quite generally we investigate the relationships among the endogenous variables (outputs) and determine the effects of the exogenous variables on each endogenous variable. The model is estimated by two stage least squares which is appropriate for estimating simultaneous-equation models. Two stage least squares estimates are consistent while ordinary least squares estimates are not. As the name suggests, two stage least squares involves two steps. At the first stage, each endogenous variable is regressed on all of the exogenous variables. The resultant parameter estimates are called reduced form parameter estimates. At the second stage each endogenous variable is regressed on instruments of some of the other endogenous variables (obtained from the first stage) and those exogenous variables that have a direct effect on the output. These parameter estimates are called structural form equation estimates. The structural form parameters measure the direct effect of an explanatory variable on an endogenous variable. The reduced form parameters measure the total effect (both direct and indirect via another endogenous variable) of an explanatory variable on an endogenous variable.

Estimation and Identification

Usually, simultaneous equations models are identified by exclusion restrictions on the endogenous and exogenous variables. In education one rarely knows which variables can or should be excluded. In this model, estimation of the structural form proceeds heuristically. With few exceptions, an explanatory variable (endogenous or exogenous) is included if and only if the associated t-statistic exceeds unity in absolute value. We imposed some additional constraints only an the achievement equation. In particular, all endogenous variables were included if and only if the associated t-statistic exceeded unity. Thus, endogenous variables with negative signs were excluded. Also, parents talking about school, PTAS, was required to have a negative sign (see the coding of this variable in Table 2). All other excluded variables were insignificant at the 0.16 level of significance for all equations. In general, the structural form equations were very robust. The section on robustness discusses some alternative specifications. Identification was checked a posteriori. Each equation is over-identified many times over.

Results

Results for the endogenous variables

The results for the endogenous variables appear in Table 7. This table contains the estimated structural form parameters and the associated t-statistics in parentheses. The perceived parents' expectations equation and the perceived teachers' expectations equation and the perceived teachers' expectations equation were not presented due to space limitations, and because they are less interesting than the other equations.

Table 7 about here

The following figure indicates the estimated relationships among the endogenous variables. The lines with arrow heads indicate positive, significant second stage regression coefficients ($p < 0.05$). The dotted lines with arrowheads indicate positive but less significant second stage regression coefficients ($p < 0.16$).

Figure 1 about here

Achievement of Asian American students appears to depend on only two endogenous variables: participation in a college program and belief in one's ability to control one's environment, "control." The first relationship suggests that Asian Americans should have exposure to academic work within college preparatory programs. The importance of "control" for achievement suggests that in order to increase achievement a student should feel able to determine his future successes and failures.

Achievement feeds back to four variables: participation in a college preparatory program, demonstrated motivation, achievement motivation and belief in one's ability to control one's environment. The effect of achievement on participation in a college preparatory program is expected since educators place high achieving students in such programs. The effect of achievement on the two motivational variables suggests that Asian Americans rationally view their achievement as reason to continue to work hard in school and to want to achieve. Similarly, the effect of achievement on the belief in one's ability to control one's environment indicates that achievement promotes a sense of mastery over the determination of one's successes and failures.

Self esteem appears to depend significantly on perceived teachers' expectations. Thus, Asian Americans appear to value highly their teachers' expectations. Self esteem affects "control" and expectations. If Asian Americans feel worthy then they will feel able to master their environment through their own effort and will hold high expectations. Interestingly, self esteem does not have a direct effect on achievement.

Belief in one's ability to control one's environment appears to depend on self esteem, achievement, and achievement motivation. Perceived teachers' expectations also affect this variable but not as significantly. The effects of self esteem, achievement, and perceived teachers' expectations on "control" suggest that if a student perceives either a positive or negative reinforcement as a result of his own behavior, then this reinforcement will strengthen or weaken the potential for that behavior to reoccur in a similar situation.

The two motivational variables, achievement motivation and demonstrated motivation, seem to have no direct relationship to each other but depend on similar variables including perceived parents' expectations and achievement. The effects of perceived parents' expectations reflect the importance of parents' academic wants for their children. The effects of achievement suggest that students revise their aspirations and their efforts in light of academic successes or failures. How hard an Asian American student works in school depends not only on his perceived parental expectations and his academic successes and failures but also to a lesser extent on his expectations.

The expectations of Asian American students depend on the motivational variables, self esteem, and perceived parents' expectations. The student forms his expectations by evaluating his parents' expectations for him, his own aspirations, his own effort and his current academic success. Of these variables, aspirations appear particularly important.

The major role of the college preparatory program is its apparent effect on achievement. Motivation and expectations have no direct effect on achievement--only an indirect effect via the college preparatory program. Participation in this program does seem to improve achievement. At the same time one should note that a student must have a reasonable achievement level in order to place in a college preparatory program.

Results for the exogenous variables

The results for the demographic and home background variables appear in Table 8, those for student composition variables in Table 9, the teachers variables in Table 10, the school characteristic variables in Table 11, the regional and other variables in Table 12. Each table contains the estimated reduced form coefficients (R.F.) and the estimated structural form coefficients (S.F.). Again, the t-statistics are in parentheses. The last table contains two goodness of fit measures which differ only for the second stage. The first, R^2, is the multiple correlation coefficient based on the estimated coefficients, the actual values of the exogenous variables and the predicted values of the endogenous variables from the first stage. The other, MLR^2, is the multiple correlation coefficient based on the same second stage coefficients, the actual values of the exogenous variables and the actual values of the endogenous variables. Unfortunately, we cannot summarize the results in a single diagram. For the most part, we shall discuss only the structural form results. We do not discuss the effects of the exogenous variables on participation in a college preparatory program, perceived parents' expectations and perceived teachers' expectations because of space contraints. Here we plan to concentrate on the most interesting findings for the exogenous variables.

Demographic and home background variables. Twelfth grade Asian American males have much higher achievement than do females. However, females are particularly well motivated and have much more control over their environment than do males. No significant sex differences exist for expectations and self esteem.

Table 8 about here

Socioeconomic background affects negatively how hard a student works and positively his self esteem. However, unlike most other educational research we find that socioeconomic status has no direct effect on the achievement, expectations, and sense of control of Asian American students. Another home variable, number of older brother and sisters, has no direct effect on these outputs which also differs from previous research. Speaking a foreign language in the home negatively affects achievement and control but positively affects aspirations and expectations.

Student composition variables. While individual socioeconomic status of the student does not affect his achievement, average socioeconomic status of students in the school does affect his achievement. Average socioeconomic status positively affects self esteem as well. The racial compositions of the classroom and school, which elicit considerable concern from parents, have little effect on the endogenous variables. Motivation is slightly higher in schools with a small proportion of whites but expectations are higher in schools with a high proportion of whites.

Table 9 about here

Teachers variables. Teachers' verbal ability, (lack of) experience, and sex (female) are important for achievement. Class size is unimportant for all endogenous variables except that large classes increase demonstrated motivation. The proportion of white teachers increases motivation but lowers expectations. Male teachers positively affect a student's expectations and "control".

Table 10 about here

School characteristics variables. None of the school characteristics have a significant, direct, effect on achievement. When school variables are significant, many of them have the "wrong sign". Only for expectations does school facilities have a positive sign and problems in the school has a negative sign.

Table 11 about here

Regional and other variables. Asian American students who live in a S.M.S.A. have a lower sense of control and a higher, but not very significant, achievement and demonstrated motivation than do students who do not live in a S.M.S.A. Most Asian American students (over 80%) live in the Far West. This category is the one that is excluded from the regressions. Asian students from the Northeast do not appear to be significantly different from Asian students from the Far West. In general, these students have higher values of the endogenous variables than do other Asian American students.

Table 12 about here

Robustness of the Model

In general, the results are very robust. For some equations, however, it is possible to converge to two reasonable specifications. In this section we discuss these situations.

Consider first the achievement equation. If we include every significant variable ($p < 0.16$) and exclude every insignificient variable the main result is that PTAS enters with a significiant, positive coefficient ($p < 0.05$). At the same times the t-statistic for AGE becomes less than unity in absolute value but little else changes.

The college preparatory program equation is quite stable. However, it could be argued that all the regional and school characteristic variables should be excluded except the proportion of students in the school who are in a college preparatory program. In this case, achievement becomes insignificant but self esteem enters ($t = 2.186$). INFO and LSTCHSCL become insignificant ($t < 1.0$) while RBS ($t = -1.320$), SES ($t = 1.004$) and the constant term ($t = 4.008$) enter. Both goodness of fit measures for the presented equation are higher than those for the alternatives.

It is possible to obtain an equation for achievement motivation in which perceived teachers' expectations enters with a significant ($p < 0.05$) coefficient. In comparison to the presented equation this alternative equation also includes AGE but excludes TAVR, PWTCHLY, and NTLNGC. However, if one adds the constant term or TAVR then perceived teachers' expectations becomes insignificant. For this reason we prefer the equation discussed above.

It is possible to obtain a demonstrated motivation equation in which participation in the college preparatory program enters with a significant coefficient ($p < 0.16$). In comparison to the presented equation this equation excludes EXP, TWOP, PROBLEMS, PRNMADG and SMSA. All excluded variables are insignificant ($p > 0.16$). However, both measures of goodness of fit for this equation are lower than those for the presented equation.

The expectations equation is quite robust and no reasonable alternatives exist. Some alternatives exist for the self esteem equation. If SEX is excluded then control becomes insignificant ($t < 1.0$). If, in addition, AVSES or TV is forced out of this latter equation then achievement enters with a significant coefficient ($t = 1.741$). The control equation is quite robust and no reasonable alternatives exist.

Discussion

The interaction among the endogenous variables indicates that Asian Americans possess a complex but logical view of their educational process. The numerous feedback effects reveal an on-going re-evaluation of their educational process. The Asian American emerges as situation oriented rather than individual-centered. These orientations appear in two interaction subsets in the endogenous model. One subset includes perceived teachers' expectations, the self concept variables (self esteem and control) and achievement. Here the teacher is indirectly important for pupil achievement because students evaluate their self esteem and sense of control in light of their perceptions of their teachers' expectations. Self esteem affects sense of control which, in turn, affects achievement. Thus both self esteem and sense of control emerge as related to the classroom situation. Asian Americans form their self concepts based on their past achievement and their perceptions of their teachers' evaluations of their potential. This dependence of their self concepts on the actual school experience and teachers' expectations suggests that Asian Americans respect authority and do not base their self concepts on external ethnic idealism. The Asian Americans' regard for their teachers' expectations may account in part for the stereotype of the Asian American as the "model" student.

The other subset includes perceived parents' expectations, the motivation variables (achievement motivation and demonstrated motivation), expectations and achievement. The relationships among these variables reflect that a continuous realistic self-evaluation occurs among motivations, expectations and achievement. Also, they highlight the importance of the Asian American familial attitudes and expectations. Parents affect their children's aspirations, expectations, how hard they work and indirectly their achievement. Familialism, a basic Asian cultural value, depends on family pride, the parent-child relationship, and principles of stability and continuity.

Both subset relationships reflect an orientation to school and home expectations for the students. Teachers and parents emerge as significant others and are important for Asian American educational attainment.

The effects of some of the home variables on the educational outputs additionally support the importance of cultural orientations. The dramatic, insignificant effect of socioeconomic status on achievement, expectations, and sense of control powerfully points to cultural values to explain educational attainments. Individual, relative wealth is unimportant for the Asian American's educational success. An alternative explanation for their success may lie in the traditional emphasis on kinship and achievement for family honor rather than their socioeconomic background. The insignificant effect of number of older brothers and sisters on all the educational outputs suggests a different familial orientation to the educational process than is usually true among whites and other groups. Again, educational attainments for Asian Americans may be more oriented toward collective achievement rather than individual achievement. However, the effect of sex, with males obtaining higher achievement levels while females obtain higher motivation and sense of control, suggests cultural differentiation between males and females. Traditionally, both within Asian society and American society, females have occupied a subordinate position.

The effects of some of the school variables on the educational outputs suggest, on the one hand, the importance of certain teacher characteristics, and, on the other, the unimportance of certain classroom and school characteristics. Inexperienced, female teachers with high verbal ability positively affect achievement. However, class size and racial composition appear relatively unimportant for educational attainment. These results reflect a respect for the authority and ability of the teacher. At the same time, the Asian American will achieve in most classroom situtations. The Asian American does not appear to require individualized attention to raise his achievement nor does racial composition appear to affect his achievement. Interestingly, while individual socioeconomic status was not important for pupil achievement the average socioeconomic status of the school is important for pupil achievement. This difference between the individual and the group socioeconomic status may again reflect a collective orientation among Asian Americans.

Generally, this research concludes that while policymakers should provide good teachers for Asian Americans, on average, the Asian American is performing well in the present system or, perhaps, in spite of the present system. While Asian Americans need support from their teachers, their ethnic backgrounds provide strong support for educational attainments. The Asian American emerges as an adaptive, rational student who achieves well in school with the support of his cultural tradition. In a dominant society which values individual success and wealth, the Asian American achieves individually while maintaining a collective identity.

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Footnotes

[1] Our approach in this paper follows that of Levin (1970) and Boardman et al. (1977).

Table 1: Description of the Endogenous Variables

Variable Name	Mean (s.d.)	Description
ACH	2.070 (3.388)	Achievement; an index constructed from the number of correct verbal, general information, reading, nonverbal and mathematical answers ($\alpha \approx 0.91$).
MOTACH	0.280 (1.536)	Achievement motivation; an index constructed from how far the pupil wants to go in school, how good he want to be in school, how happy to quit school ($\alpha \approx 0.56$).
DEMMOT	0.442 (1.460)	Demonstrated motivation; an index constructed from number of hours study and how often stay away because he doesn't want to come ($\alpha \approx 0.40$).
CPREP	0.529 (0.499)	In a college preparatory program = 1; otherwise = 0.
EXP	0.536 (1.637)	Expectations; an index constructed from occupational expectations and plans about college ($\alpha \approx 0.56$).
SELFEST	-0.257 (1.852)	Self esteem; an index constructed from sometimes student feels he cannot learn, teachers go too fast, would change to be somebody different, able to do many things well and assessment of own academic ability ($\alpha \approx 0.65$).
CONTROL	0.166 (1.389)	Internal control or belief in his ability to control his environment; an index constructed from good luck is more important than hard work for success, everytime get ahead something or somebody stops me, even with good education hard to get right job ($\alpha \approx 0.59$).

Table 1: Description of the Endogenous Variables (cont'd)

Variable Name	Mean (s.d.)	Description
PPAEXP	0.373 (2.196)	Perceived parents' expectations; an index constructed from education mother wants student to have, education father wants student to have, how well father wants student to do in class, and how well mother wants students to do in class ($\alpha \approx 0.76$).
PTEXP	-4.425 (1.433)	Perceived teachers' expectations; teachers expect student to be one of the best in class = -2,..., good enough to get by = -8.

Table 2: Description of the Demographic and Home Background Variables

Variable Name	Mean (s.d.)	Description
SEX	2.911 (0.996)	Sex; male = 2, female = 4.
AGE	3.761 (0.786)	Age; less than 14 = 1,..., 20 or older = 7.
SES	0.665 (1.963)	Socioeconomic background; an index constructed from father's and mother's educational level, fathers' occupational level, encyclopedia in home, attended kindergarten school, number of people per room in the house, attended Nursery school, and number of hours work for pay ($\alpha \approx 0.65$).
INFO	0.624 (1.473)	Available information in the home; an index constructed from number of books in home, daily newspaper in home, number of magazines in home, dictionary in home, and trips to library ($\alpha \approx 0.54$).
TWOP	0.777 (0.416)	Two parents; two parents alive and living at home = 1, otherwise = 0.
NOBAS	2.671 (1.890)	Number of older brothers and sisters; none older = 1, ..., 8 or more older = 9.
FL	2.874 (1.091)	Foreign language; frequently speak a foreign language out of school = 1,..., never speak a foreign language = 4.
RBS	2.107 (1.114)	Reading before school; not read to before going to school = 1, regularly read to before going to school = 4.

Table 2: Description of the Demographic and Home Background Variable (Cont'd)

PTAAT	1.650 (0.985)	Parents attend PTA: parents not go to PTA = 1,..., parents go most of the time = 4.
PTAS	2.207 (1.119)	Parents talk about school; parents talk about school once a day = 1,..., parents never or hardly ever talk about school = 4.
TC	0.798 (0.402)	This city; spent most of life in this city or town = 1, otherwise = 0.
NTCHSCL	2.189 (1.395)	Number of times changed school; never changed school = 1,..., changed school four or more times = 5.
LSTCHSCL	6.189 (1.532)	Last time changed school; changed school within a year = 2,..., changed school five or more years ago = 7.

Table 3: Description of the School's Student Composition Variables

Variable Name	Mean (s.d.)	Description
AVSES	0.474 (0.596)	Average socioeconomic background.
PWPICLY	2.931 (1.191)	Proportion of white students in class last year; no whites = 1,..., all white = 5.
PWPICLY2	10.005 (7.564)	$(\text{PWPICLY})^2$
PWHITE	4.744 (3.289)	Proportion of white students in the school; no whites = 1,..., all white = 12
PWHITE2	33.313 (40.353)	$(\text{PWHITE})^2$

Table 4: Description of the Teachers' Variables

Variable Name	Mean (s.d.)	Description
TAVR	25.347 (0.891)	Teachers' average verbal right; average verbal right for all teachers of twelfth grade students (max = 30).
NTPRPUP	0.039 (0.005)	Number of teachers per pupil.
TANYTCH	4.764 (0.883)	Teachers' average number of years teaching; no years teaching = 1,..., 30 or more years = 0.
PWTCHLY	3.137 (1.464)	Proportion of white teachers last year; no white teachers = 1,..., all white teachers = 5.
TASEX	3.015 (0.341)	Teachers' sex; all males = 2,..., all females = 4.
TPTC	0.495 (0.214)	Proportion of teachers from this city; all from this city = 1,..., none from this city = 0.
TPADTN	0.155 (0.118)	Teachers' problems with administration; lack of effective leadership = 1,..., no problem = 0.

Table 5: Description of the School Characteristics Variables

Variable Name	Mean (s.d.)	Description
FACILITS	12.633 (1.464)	School facilities; a combination of principal's responses about library, auditorium, gymnasium, laboratories, etc.
PROBLEMS	167.24 (1.589)	Problems in the school; a combination of principal's responses about problems of damage, discourtesy and violence to teachers, racial tension, stealing, drugs, and drink (high value means many problems).
AGES	5.613 (1.692)	Age of school; main classroom less than one year old = 1,..., more than 39 years old = 7.
PRPCPREP	0.409 (0.097)	Proportion of students in the college preparatory program.
NTCHLV	1.983 (1.427)	Number of teachers who leave; less than 5% left = 1,..., more than 50% left = 7.
PRNMADG	3.983 (0.666)	Principal has M.A. degree; no degree = 1,..., Doctorate = 6.

Table 6: Description of the Regional and other Variables

Variable Name	Mean (s.d.)	Description
SMSA	1.180 (0.384)	Standard metropolitan statistical area; within metropolitan area = 1, otherwise = 2.
NEWENG	0.008 (0.087)	New england states = 1, otherwise = 0.
MIDATL	0.093 (0.290)	Mid atlantic states = 1, otherwise = 0.
LAKES	0.031 (0.173)	Great lakes states = 1, otherwise = 0.
PLAINS	0.014 (0.116)	Plains states = 1, otherwise = 0.
SEAST	0.014 (0.116)	Southeastern states = 1, otherwise = 0.
SWEST	0.014 (0.119)	Southwestern states = 1, otherwise = 0. (Farwest excluded from regressions)
NTLKGC	2.237 (1.164)	Number of times talk to guidance counsellor; not once = 1,..., six or more times = 5.
NHWTV	3.835 (2.009)	Number of hours watch T.V.; not watch T.V. = 1,..., 4 or more hours a day = 7.
CONST	1.000 (0.000)	Constant.

Tables 7-12 appear in Appendix V pages AV.12-AV.22.

Title Page Footnote

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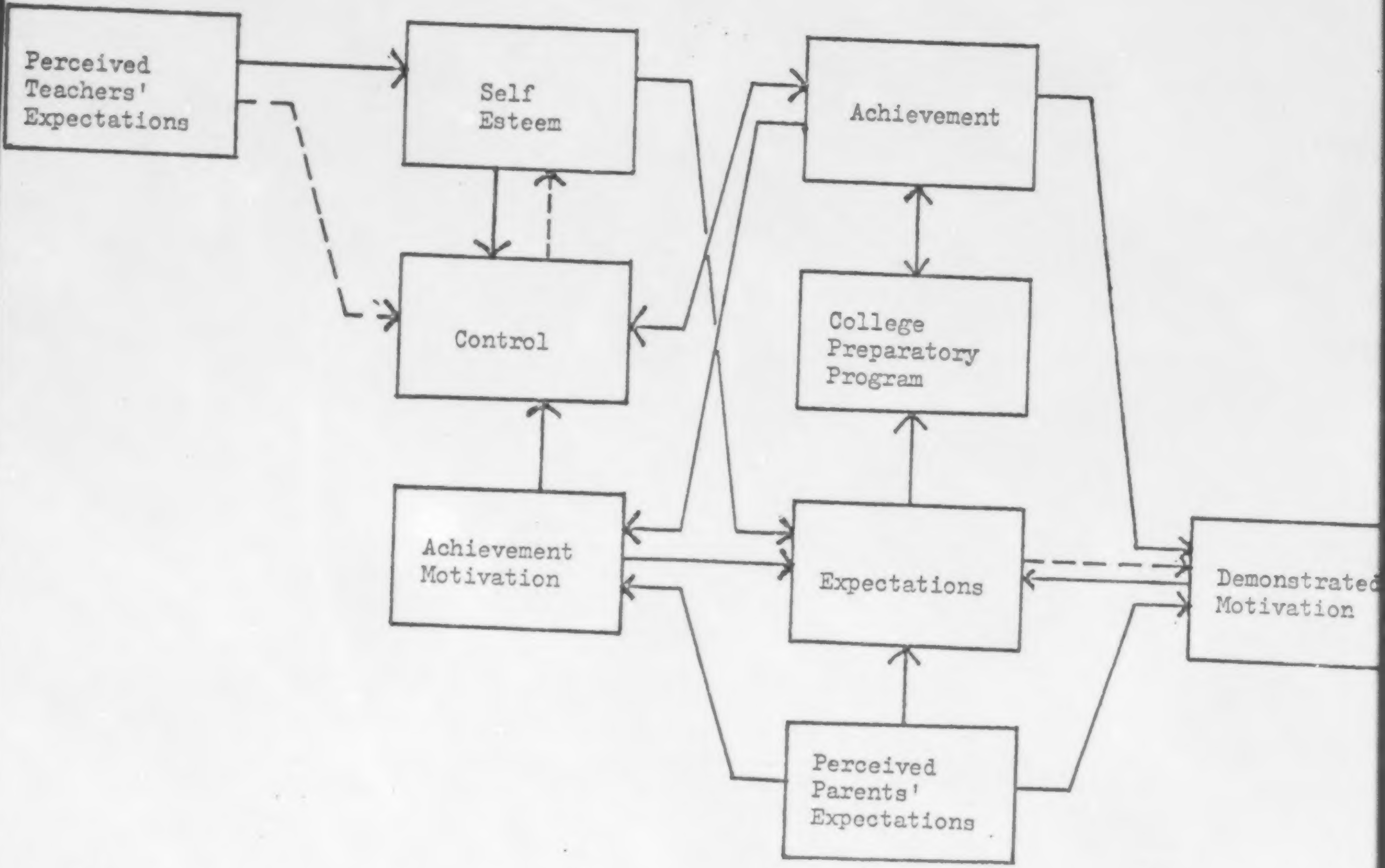

Perceived Teachers' Expectations
Self Esteem
Achievement
Control
College Preparatory Program
Achievement Motivation
Expectations
Demonstrated Motivation
Perceived Parents' Expectations

Figure 1

The Estimated Relationships Among the Endogenous Variables for Asian American Students (excluding the Causes of Perceived Parents' and Teachers' Expectations).

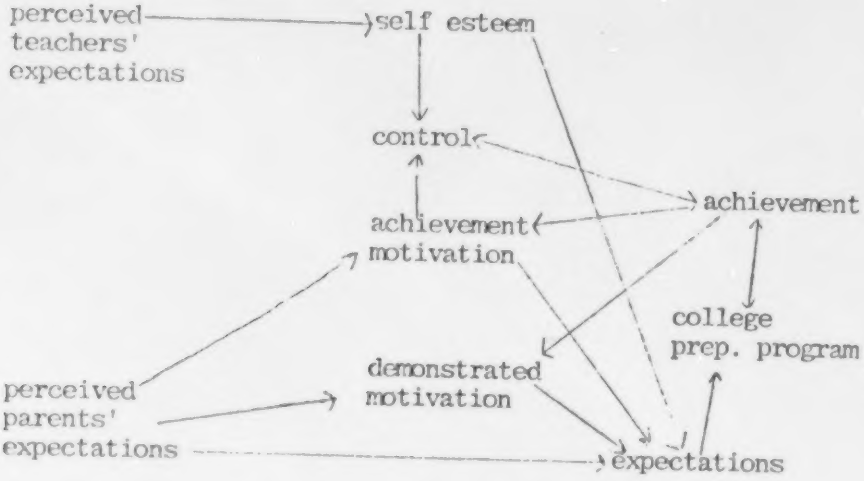
SECTION VI

" The Process of Education for Twelfth Grade Asian
and Puerto Rican American Students" by
Anthony E. Boardman and Anne Lloyd,
revised and published in Integrated Education,
16, March-April 1978, 44-46

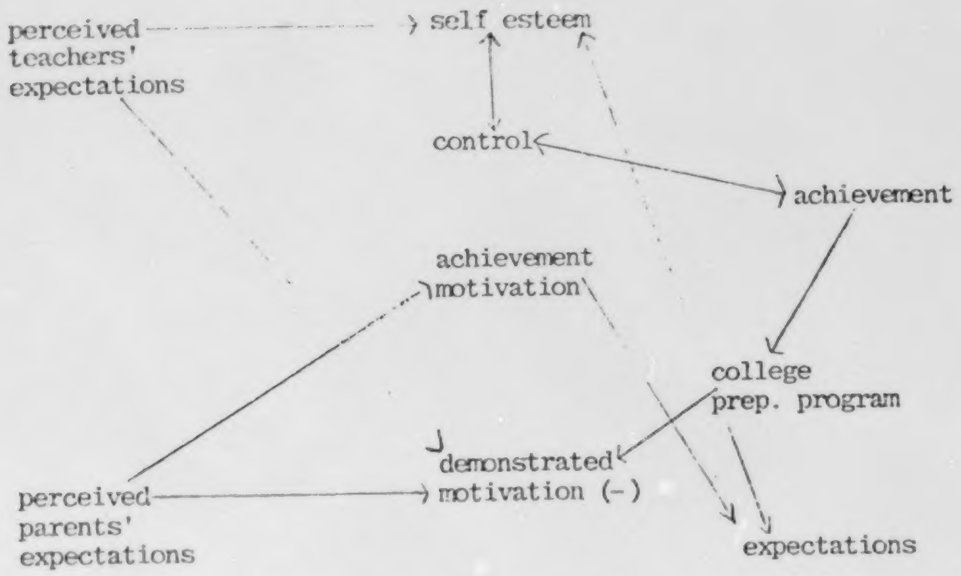
Research in multicultural education frequently focuses on the determinants of various educational outputs such as student achievement and attitudes. While researchers have investigated the cultural and structural variables affecting various outputs, few have explicitly modelled these attitudes and achievement as determined jointly. In this paper we summarize our on-going research on simultaneous equations models of the educational processes for various minority groups by highlighting the processes of education for twelfth grade Asian and Puerto Rican American students. Our purpose here is not to discuss the methodology by which one can formulate such models(1) nor to present the entire statistical results but rather to comment on similarities and differences between the educational processes for two minority groups which is an essential pre-requisite to educational policy-making in multicultural education.

For this research we postulate nine educational outputs (endogenous variables); achievement, participation in a college preparatory program, achievement motivation, demonstrated motivation, expectations, self esteem, belief in one's ability to control one's environment, pupil's perceived parents' expectations and pupil's perceived teachers' expectations. We investigate the relationships among these variables and, at the same time, we examine the effects of forty-eight inputs (exogenous variables) on each endogenous variable, except perceived parents' and teachers' expectations. These inputs include measures of pupil demographics, family background, geographic stability, peer group characteristics, teachers' characteristics, and other school characteristics. Stated quite generally we investigate the empirical relationships among the outputs and attempt to determine the effects of each input on each output. The models are estimated by two stage least squares. Estimation of this complex model requires the large sample base available only in the *Equality of Educational Opportunity* survey(2). Currently the model is being tested and validated using data from the National Longitudinal Study of the High School Class of 1972. In this paper we begin with a discussion of the estimated relationships among the endogenous variables and later discuss the effects of the exogenous variables.

The following figures illustrate the estimated relationships among the outputs. The lines with arrowheads indicate positive, significant (at the 0.05 level for a one-sided alternative) second stage regression coefficients except for the one from college preparatory program to demonstrated motivation for Puerto Ricans which indicates a negative, significant coefficient.


perceived teachers' expectations
self esteem
control
achievement
achievement motivation
college prep. program
demonstrated motivation
perceived parents' expectations
expectations

ASIAN AMERICANS


perceived teachers' expectations
self esteem
control
achievement
achievement motivation
college prep. program
demonstrated motivation (-)
perceived parents' expectations
expectations

PUERTO RICAN AMERICANS

These figures show that Asian and Puerto Rican American twelfth grade students have different complex learning processes. While similar relationships exist among certain variables for both groups, the Asian American model contains more feedback effects among the variables.

The variable most often stressed by educators and the public, academic achievement, depends for both groups on a student's belief in his ability to control his environment. The importance of control for achievement suggests that in order to increase achievement a student should believe he is able to determine his future successes and failures--a belief that has been particularly difficult for minorities to realize given the structural conditions of our society. Perhaps teachers may at least increase "in school" control by allowing more student control of the learning process and focus on the strengthening of student problem solving skills. Individualized, self-paced learning might allow each student to feel in control of the learning situation and thus positively affect his achievement. Achievement, in turn, affects control which suggests that achievement promotes a sense of mastery over the determination of one's successes and failures. Thus, schools can have an affect on a student's sense of control given often overwhelming external constraints.

Self esteem and motivation, affective variables often emphasized in compensatory educational programs, have no direct effect on achievement for Asian American and Puerto Rican American students. It has been thought that these affective variables and achievement are determined simultaneously. As a consequence educators have attempted strategies to improve children's self esteem and motivation on the assumption that higher self esteem and motivation will improve academic achievement. Our research, however, suggests that strategies aimed at increasing self esteem and motivation will not directly increase achievement. These results obtain for twelfth grade students and different relationships may exist among these variables for younger children, who have been the major focus of compensatory education. Of course, given the uncertainty of what educational outputs are the most important for future life chances educators may wish to increase self esteem and motivation--in addition to or irrespective of achievement.

The role of participation in a college preparatory program in this model differs between the two groups. Participation in such a program appears to benefit Asian American achievement but has no significant effect on Puerto Rican achievement. The negative effect of participation in such programs for Puerto Rican motivation is rather discouraging for educators. However, these relationships do not necessarily deny the importance of academic programs for Puerto Rican students but do suggest that such programs do not equally benefit these two groups and may suggest the necessity for programmatic change.

While Asian American achievement affects their motivation, Puerto Rican achievement does not affect their motivation. Asian American students appear to view their achievement as a direct reason to continue to work hard in school and to want to achieve while Puerto Rican students do not. Earlier research compared the achievement levels between these groups and found that Asian American students achieved significantly higher than did Puerto Rican students. Past experiences of high or low achievement in school may explain the different relationships. Asian American students possess a longer tradition of academic achievement and therefore may more readily perceive a causal relationship between achievement and motivation.

Perceived teachers' and parents' expectations are important variables in the educational process of both groups. Teachers appear to be important for the development of self esteem while parents are important for their child's motivation. Thus teachers and parents assume important but different roles in the education of children.

While this examination of the relationships among the educational outputs suggests that some strategies are better than others, our analysis of the effects of individual, home and school inputs on the educational outputs is more directly relevant to policymakers. Such an analysis enables the policymaker to decide which inputs he may wish to alter based on his preferences for each output and given the constraints he faces.

As previously stated we examine the effects of forty-eight demographic, home background, student composition, teacher, and school characteristics on each educational output. We examine the direct effect and the total effect of each exogenous variable on each output; the total effect equals the direct effect plus indirect effects via other endogenous variables. In the following discussion we summarize some of the most interesting and consistent direct effects.

Demographic and Homebackground Variables. Both twelfth grade Asian and Puerto Rican American males possess higher achievement than do females. However, Asian and Puerto Rican American females have higher demonstrated motivation and more control over their environment than do males. Female higher "control" but lower achievement may result from females' ability to control their social environment. Females may organize more efficiently as well. Puerto Rican females have lower expectations than do males while Asian American females have more motivation than do males.

Socioeconomic status negatively affects how hard Asian and Puerto Rican American students work. However, unlike most other educational research we find that socioeconomic status has no direct effect on Asian American achievement, achievement motivation, sense of control, and expectations. Conversely, socioeconomic status of Puerto Ricans positively affects their expectations and participation in a college preparatory programs. Furthermore, two other home variables, information in home and reading before school are much more important for the educational outputs of Puerto Ricans than for Asian Americans. Given that these measures of the home environment are particularly important for Puerto Rican students, social policies such as the Negative Income Tax Experiment, which directly alters the home environment, may increase educational attainments for Puerto Rican students.

Student Composition Variables. The average socioeconomic status of students in the school positively affects achievement for both groups. However, the racial composition of the school, which elicits considerable concern from parents, has small and inconsistent effects on the school outputs for both groups. These results suggest that on the issue of school desegregation it is desegregation by class rather than by race that is important, particularly for achievement.

Teacher Variables. Teachers' verbal ability is important for the achievement of both groups, however high teacher verbal ability lowers the likelihood of either group participating in a college preparatory program. Asian Americans who have female teachers have higher achievement and for both groups white teachers seem to increase demonstrated motivation but otherwise teachers' race, sex and teachers' experience had inconsistent effects on the school outputs. Class size was particularly unimportant.

Conclusions

The interactions among the school outputs suggest that Asian American twelfth grade students possess a more on-going positive re-evaluation of the process of education than do Puerto Rican American twelfth grade students. For example, this evaluation process is particularly apparent in the feedback relationships of achievement to the motivational variables which exists for Asian American students but is absent for Puerto Rican students. This result seemingly suggests to educators that Puerto Rican students, unlike Asian American students, do not as yet view some payoff to school achievement. This suggestion is not surprising when one compares the number of Puerto Ricans going on to higher education, their achievement in school, and their relative lack of economic opportunities within this society with the corresponding figures for Asian Americans. Of course, time in the American system may be a factor: Asian Americans arrived in the early 20th century while Puerto Ricans arrived much later. Also the two cultures place different emphases on education.

The different results for these two groups suggest that in the push for multicultural education the educational system should adjust to the particular needs of a group. While each group may not necessarily value the same educational outputs and not view them in the same relationships, these variables undoubtedly affect their future educational and occupational opportunities.

While differences exist between these two groups, some certain similar relationships among the outputs are evident. Perceived teachers' expectations affects the self esteem of both groups and perceived parents' expectations affects both motivation variables for both groups. If educators wish to maximize certain outputs then they should be aware of the appropriate relationships of significant others to each output. Moreover, if educators wish to emphasize achievement then the belief in one's ability to control one's environment is the crucial endogenous variable for both groups.

Turning to the school inputs, the pupil demographic and home background variables such as socioeconomic status, information in home and reading before school have more effect on the educational outputs of Puerto Ricans than for Asian Americans. While educators can do little to change the individual home background variables of the student, educators can work to alter certain student composition, teacher and school characteristics that may benefit education. An important student composition variable for both groups is the average socioeconomic status of the school — for example achievement for both groups will improve as the average socioeconomic status of the school increases. Obviously, these findings have important implications for school desegregation. Of the teachers' characteristics, the verbal ability of the teacher has the most consistent effect. For both groups teachers' experience and sex have inconsistent effects and class size, a hard fought issue with teachers' unions, is not particularly important.

In conclusion, we note that this research is more descriptive than prescriptive. Our results suggest that educators should view the process of education as a set of interrelated outputs and that the relationships among these outputs may differ across racial and ethnic groups. The complexity and variance of the educational process between minority groups indicates that educators can not assume that school resources similarly affect certain minority groups or equally affect educational variables. This complexity and variance may account for the rather mixed results from many of the recent educational programs for minority group children. With an increasing cultural awareness in education must come an increased understanding of the similarities and differences of the process of education for racial and ethnic groups.

FOOTNOTES

[1] Boardman, A.E., et al., "A Simultaneous Equations Model of the Educational Process", *Journal of Public Economics* 7 (1977), 23-49.

[2] Coleman, J.S. et al., *Equality of Educational Opportunity*, Washington, D.C.: U.S. Department of Health, Education and Welfare, 1966

SECTION VII

THE RESULTS FOR THE ENDOGENOUS VARIABLES USING THE REFORMULATED MODEL

INTRODUCTION

Section IV contains the estimated simultaneous equations model of the educational process using the total 12th grade EEOS data. In this model dummy variables were entered for each ethnic group in each equation, which allows a comparison of the mean differences between each group on each of the endogenous variables after all other variables have been controlled for. The results for the ethnic groups appear in Table I.2 and I.3. The objective of this section is to estimate the model separately for each ethnic group and to compare the results using the 12th grade EEOS data, 9th grade EEOS and the 12th grade NLS data.

The variables descriptions for the EEOS data appear in Appendix I. For both the 9th and 12th grades the variables are defined in almost identical ways and the few exceptions are listed in the Appendix. The variables for the 12th grade NLS data are described in Appendix II. There are a number of differences between the EEOS and NLS data. Most important, perhaps, is that the NLS data contain no information on the student's teachers or school and so there are much fewer variables. It should be stressed that the omission of these variables in no way biases the results because the estimation method involved the use of error component methods; see Kmenta (1971). However, it does mean that no results are available for classroom, teacher or school effects. While the EEOS and NLS endogenous variables have been given the same names,they are constructed using different questions. Many of the home background variables are similar except the NLS dataset also contains information on the sutdent's religious affiliation.

The results were obtained in the following way. The model presented in section IV was used as an initial formulation. From this formulation, the model was estimated separately for whites, Asian Americans, Native Americans, Mexican Americans, Puerto Ricans and blacks. In each equation for each ethnic group a variable was included only if its associated t statistic exceded unity. Thus estimation proceeded interatively; a set of variables was included in an equation, the insignificant variables were excluded in the next stage and then the model was checked to see if any of the excluded variables had significant t statistics when they were added to the equation, one at a time. The significant variables were then included and the process was repeated until the resultant equation contained variables with t statistics greater than unity and all excluded variables had t statistics less than unity if they were included in the equation. Sometimes this method converged to more than one specification of an equation. In such cases the equation with the highest goodness of fit (R^2) or the most intuitively acceptable equation is presented. The resultant model for Asian American students is discussed in detail in section V.

In the next stage of the analysis, each of these equations based on the 12th grade EEOS data was estimated using the same specification on the 9th grade EEOS data and the 12th grade NLS data. In this way the model is tested across grades and across time. The results of these analyses appear in Figures VII. 1-6. We see that, in general, for the 9th and 12th grade EEOS data, the models are very similar. Using this procedure on the NLS dataset proved difficult. The major reason is that the NLS dataset does not contain peer, teacher or school variables and this creates identification problems; see Johnston (1972). When such problems arise the regressand in an equation is marked by an asterick in the figure. These problems can be solved, but they are beyond the scope of this research. Henceforth in this analysis we cannot regard the NLS structural form coefficients with confidence; however, we discuss the reduced form coefficients in section VIII.

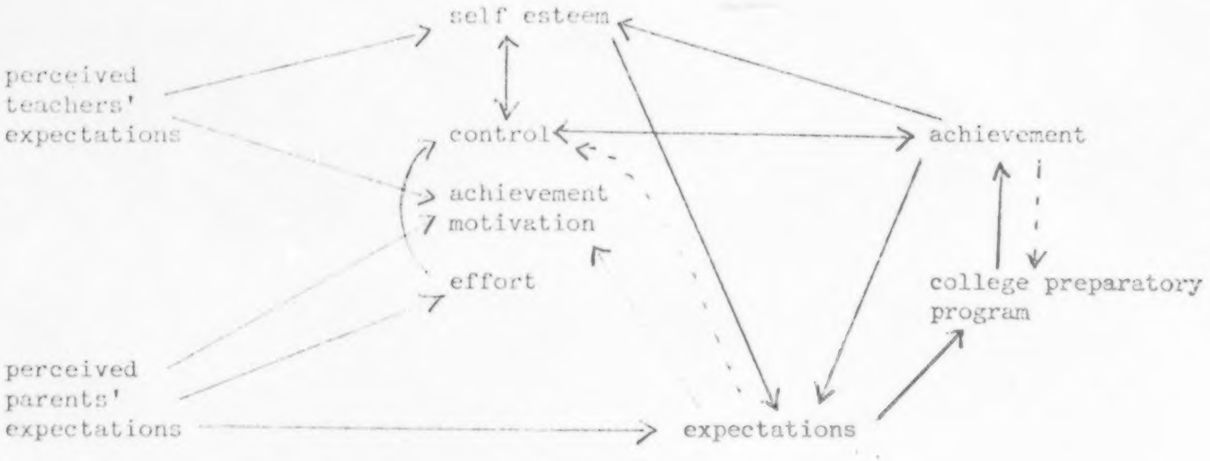
When we test the 12th grade EEOS model on the other two datasets some of included variables are insignificant and some of the excluded variables are significant when they are included in an equation. Therefore, for the 9th grade

EEOS data we repeat the process described above of excluding insignificant variables and including significant variables to obtain final estimates of the mdoel. These results appear in Figures VII. 7-12. Again, the models are quite similar.

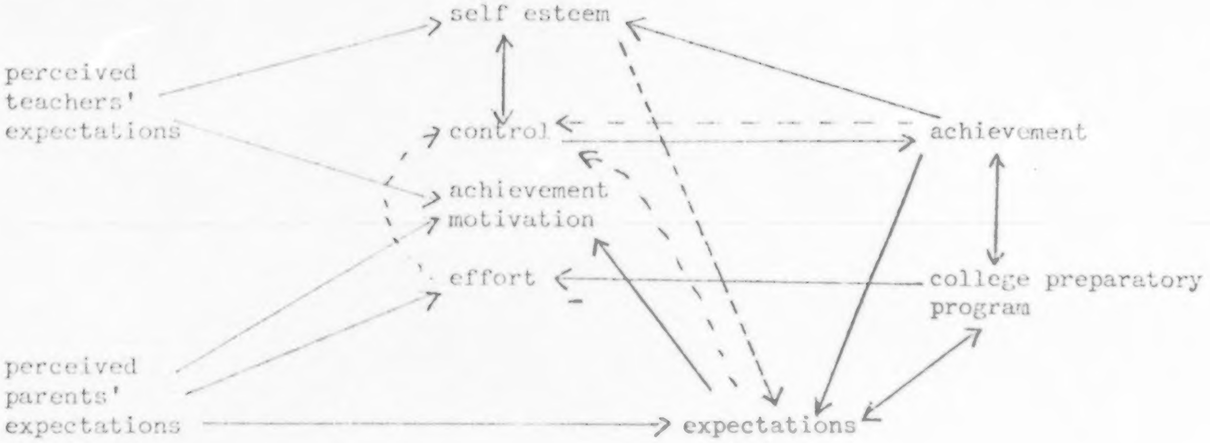
Each of the figures contains three diagrams: the top one is based on the 9th grade EEOS data, the middle one is based on the 12th grade EEOS data and the bottom one is based on the 12th grade NLS data. The arrows indicate significant causal relationships. A single arrow-head, X→Y, indicates that causality is unidirectional, in this case X causes Y. A double arrow-head, X↔Y, indicates that causality occurs in both directions; in this X causes Y and Y causes X and the variables are interdependent. All lines reflect significant two stage least squares (2SLS) regression coefficients at the 0.95 level of confidence (0.05 level of significance) for a one-sided alternative. That is, an arrow reflects a t-statistic in excess of 1.645 in absolute value. An arrow indicates positive effects, unless a (-) appears by an arrow-head which indicates a negative effect. Dotted lines indicate an effect that is significant at the 0.86 level of confidence (0.14 level of significance) for a one-sided alternative, i.e. the t-statistic exceeds unity in absolute value.

FIGURE VII. 1 WHITE ENDOGENOUS STRUCTURE: TEST OF 12th GRADE MODEL

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
-
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

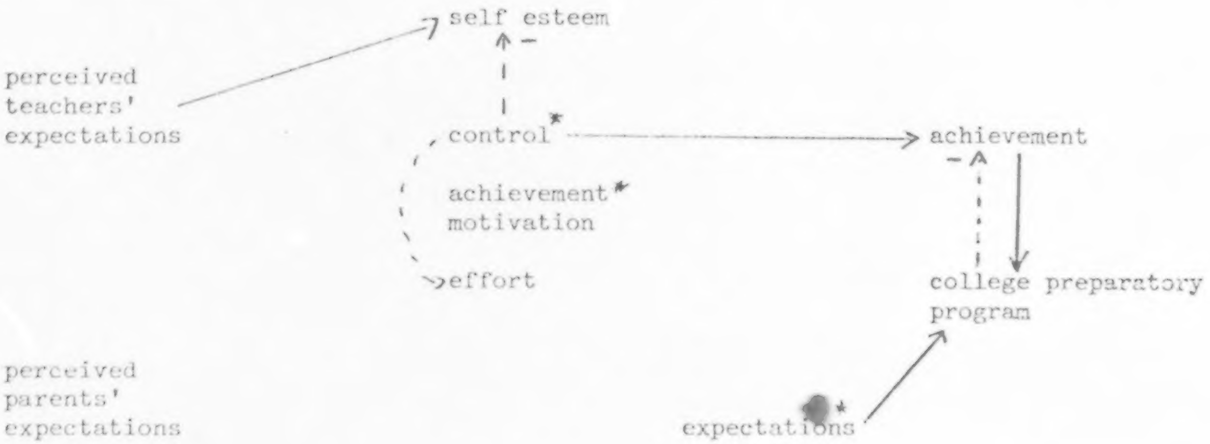
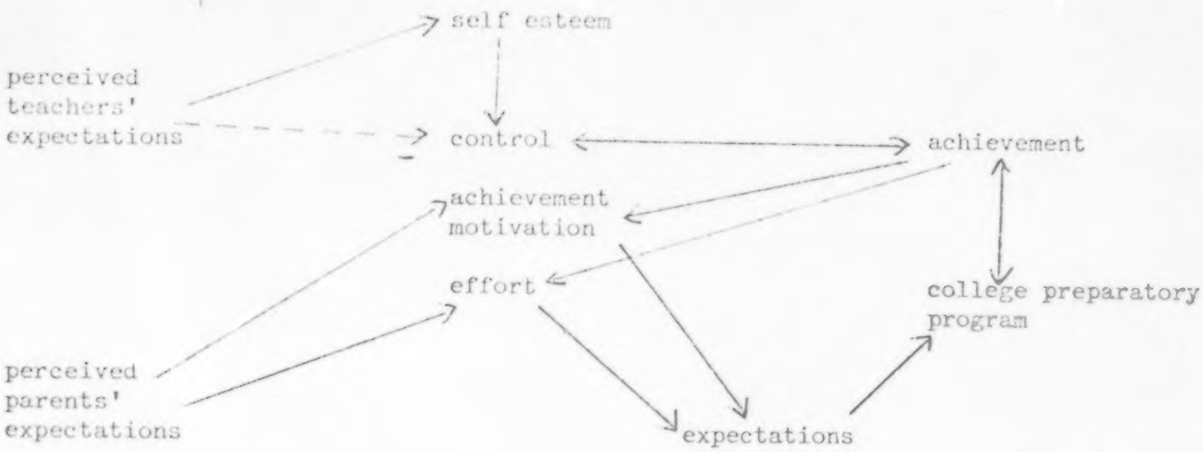
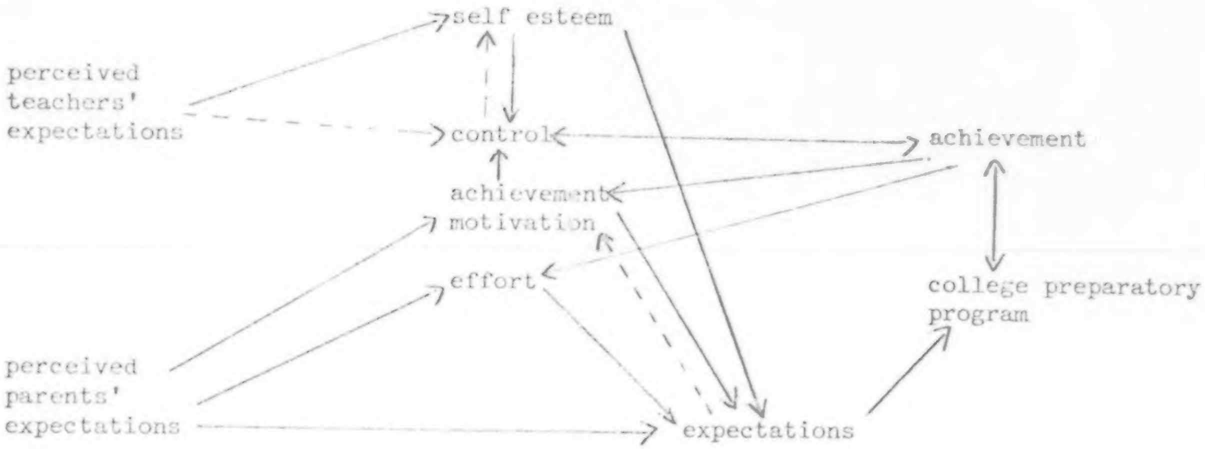

self esteem
-
perceived teachers' expectations
control*
achievement
-
achievement*
motivation
effort
college preparatory program
perceived parents' expectations
expectations*

FIGURE VII. 2 ASIAN AMERICAN ENDOGENOUS STRUCTURE: TEST OF 12TH GRADE MODEL

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

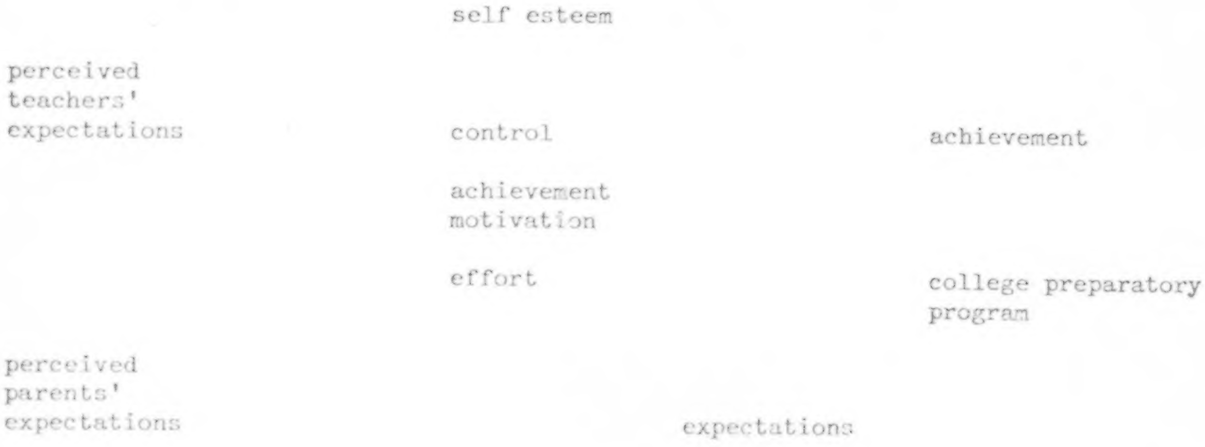
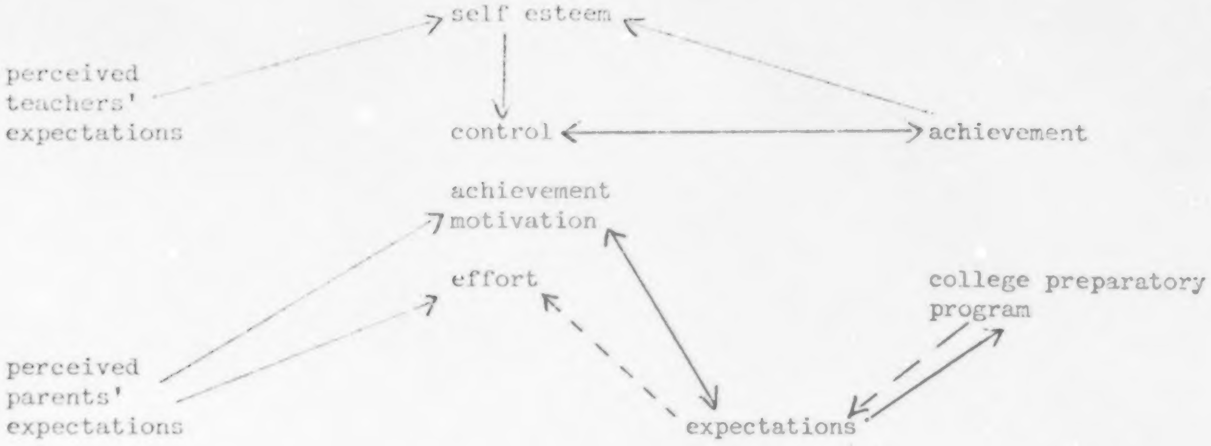
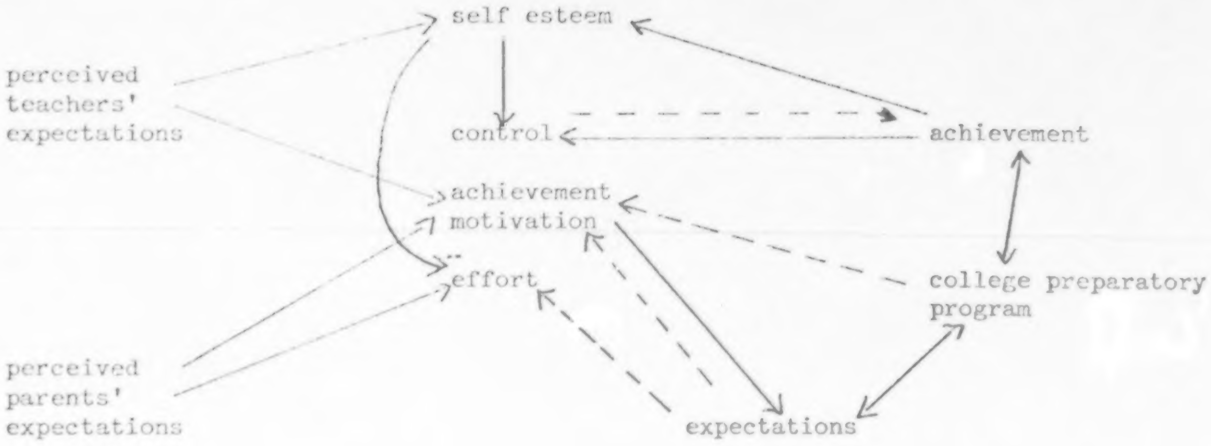

self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

FIGURE VII. 3 NATIVE AMERICAN ENDOGENOUS STRUCTURE: TEST OF 12TH GRADE MODEL

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

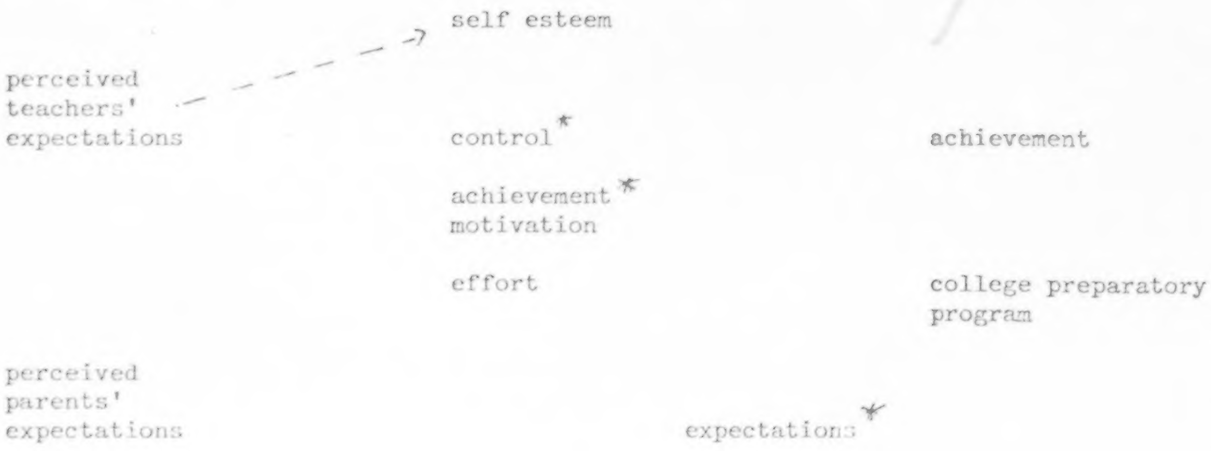
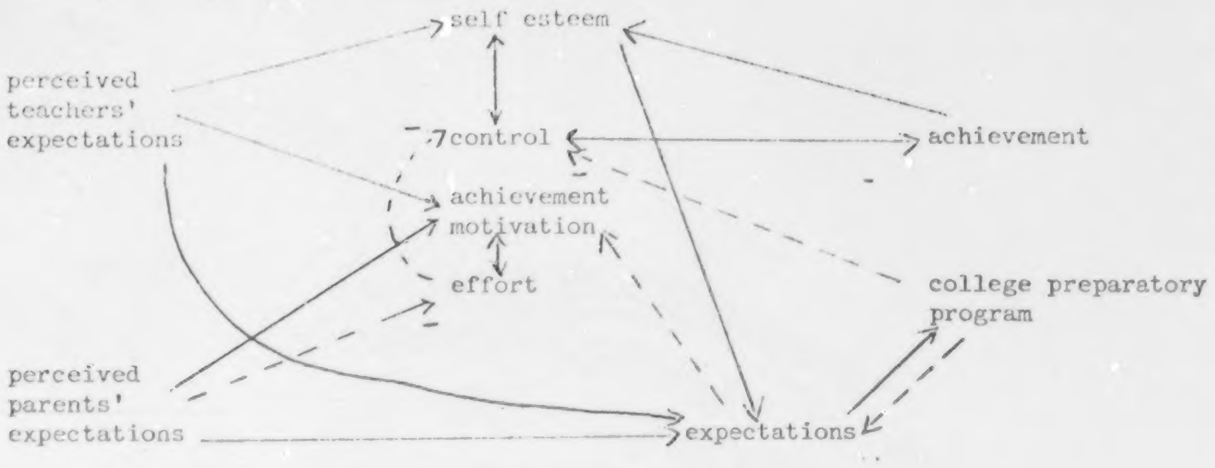
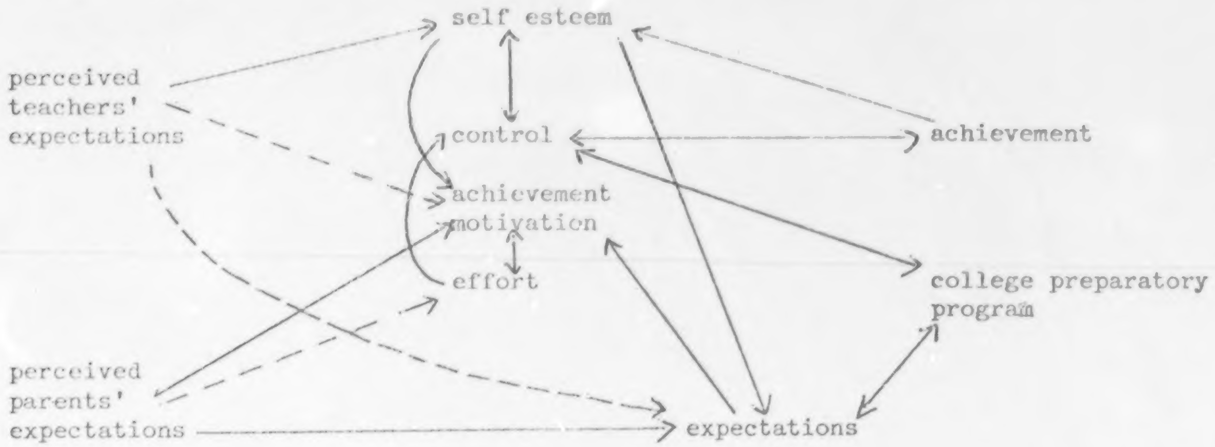

self esteem
perceived teachers' expectations
control*
achievement
achievement* motivation
effort
college preparatory program
perceived parents' expectations
expectations*

FIGURE VII. 4 MEXICAN AMERICAN ENDOGENOUS STRUCTURE: TEST OF 12TH GRADE MODEL

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations
-
-
-
-

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

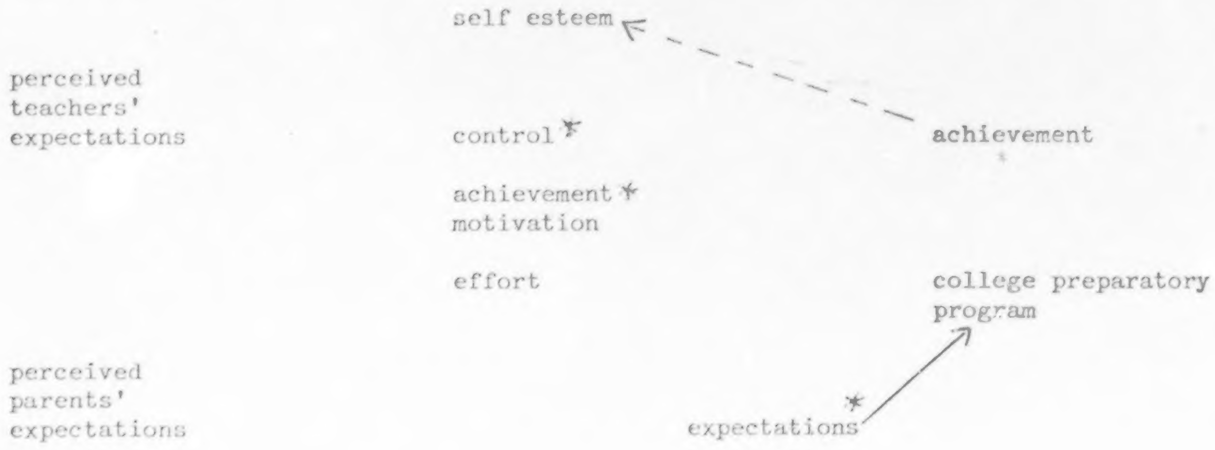
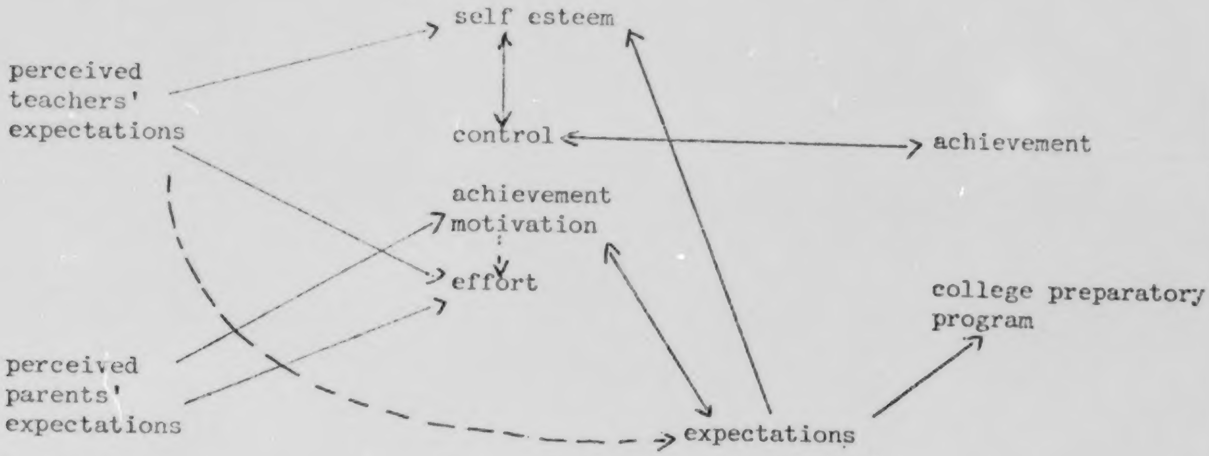
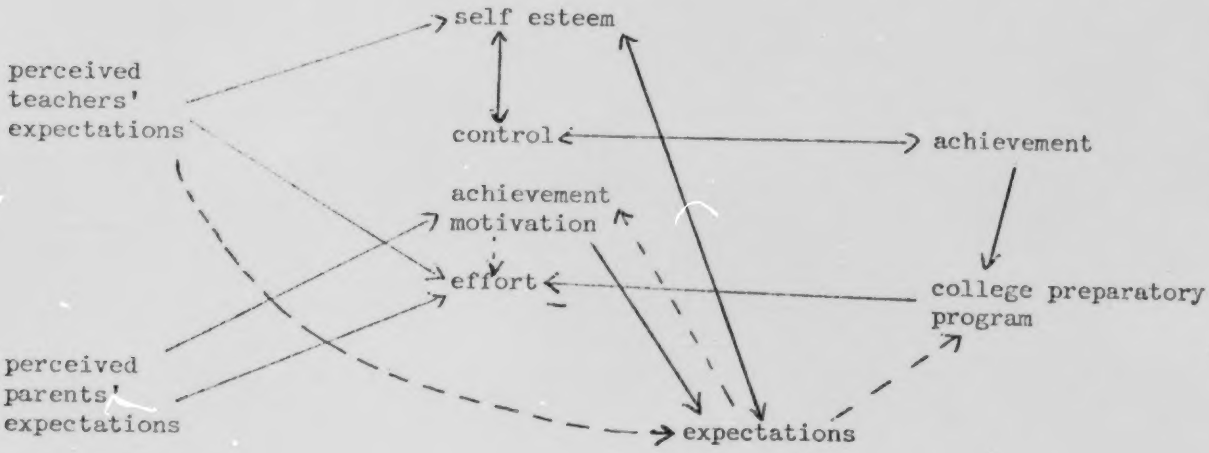

self esteem
perceived teachers' expectations
control *
achievement
achievement * motivation
effort
college preparatory program
perceived parents' expectations
* expectations

FIGURE VII. 5 PUERTO RICAN ENDOGENOUS STRUCTURE: TEST OF 12TH GRADE MODEL

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

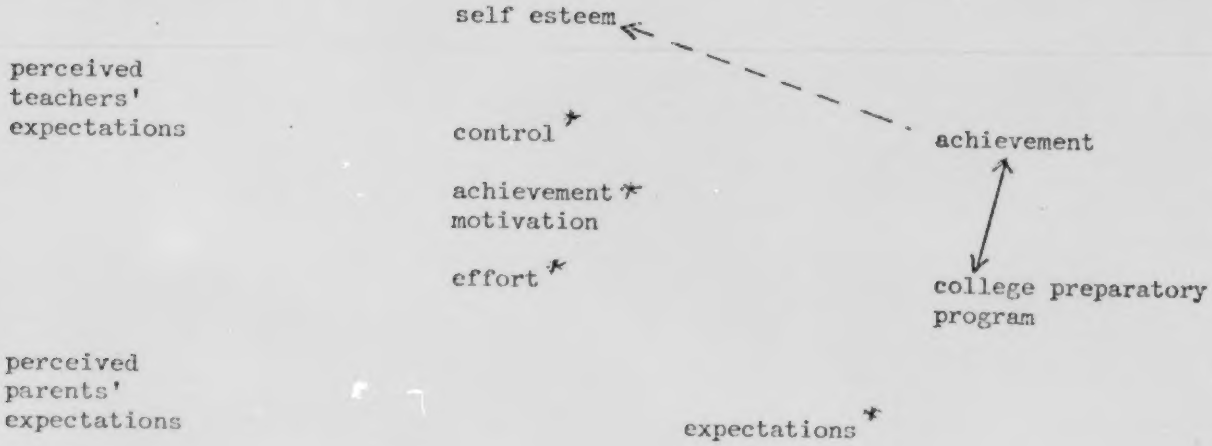
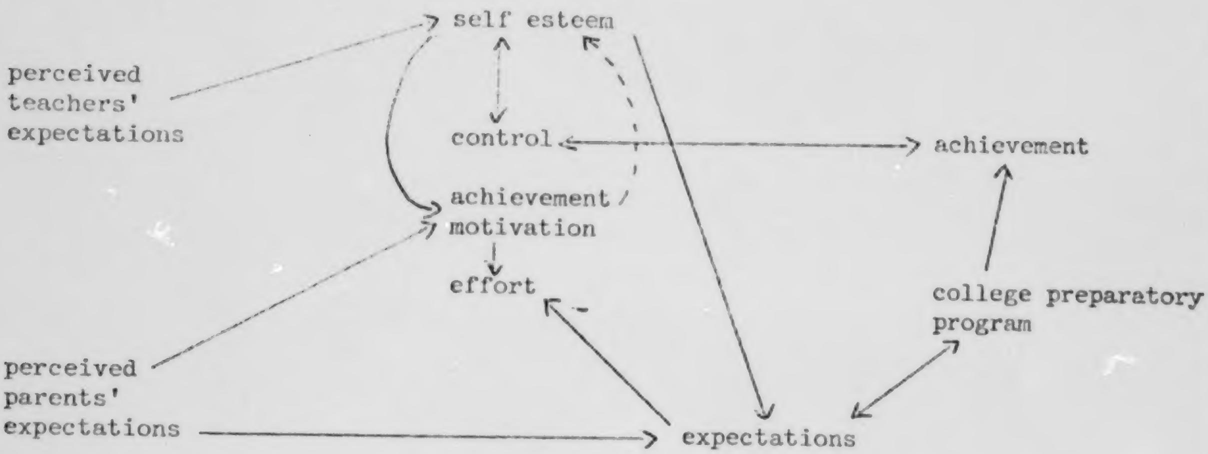
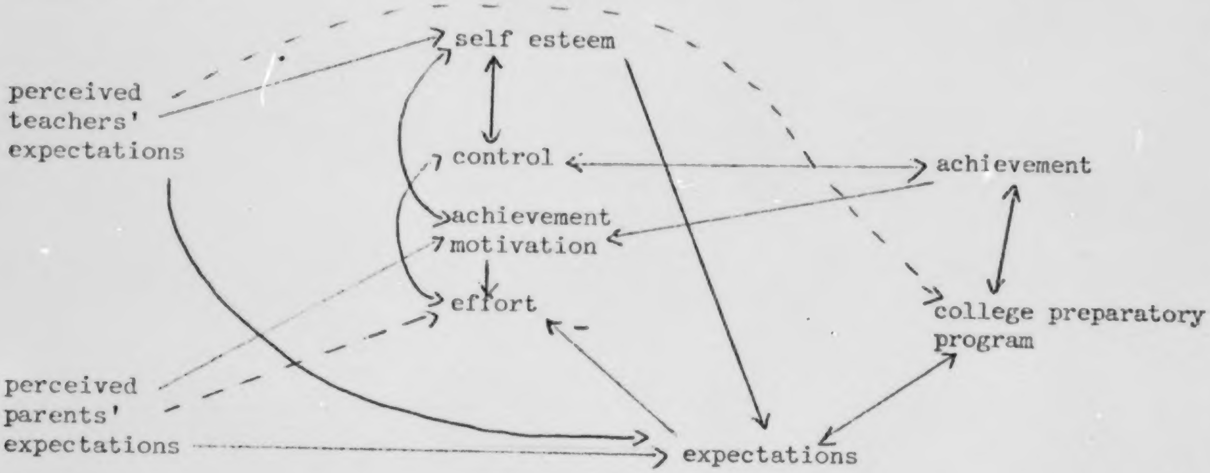

self esteem
perceived teachers' expectations
control *
achievement
achievement *
motivation
effort *
college preparatory program
perceived parents' expectations
expectations *

FIGURE VII. 6 BLACK ENDOGENOUS STRUCTURE: TEST OF 12TH GRADE MODEL

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
-
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
-
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

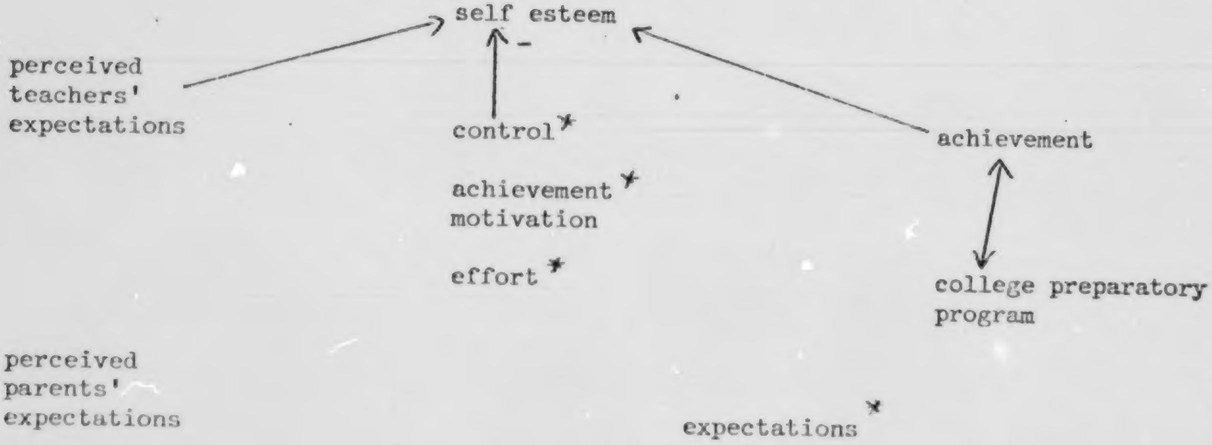
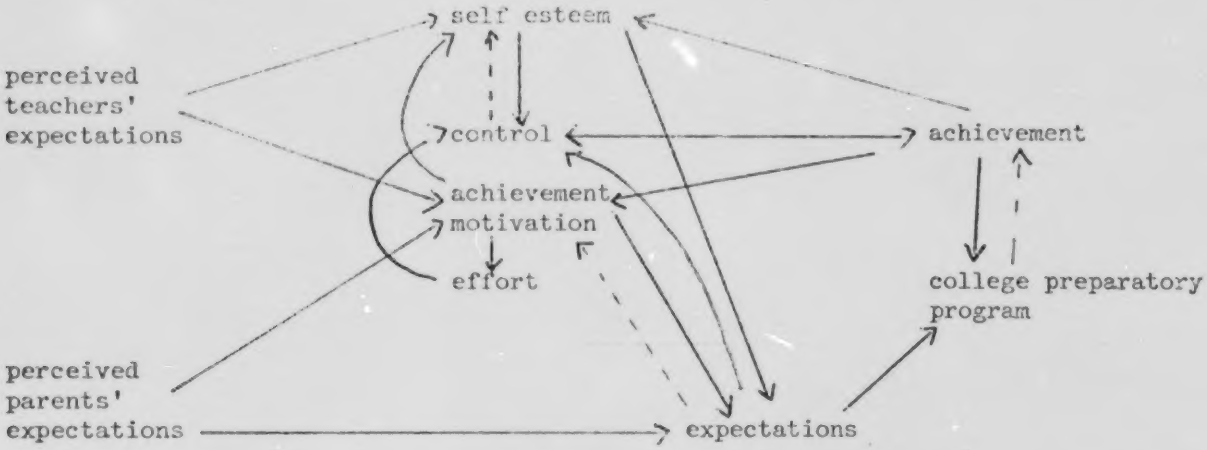
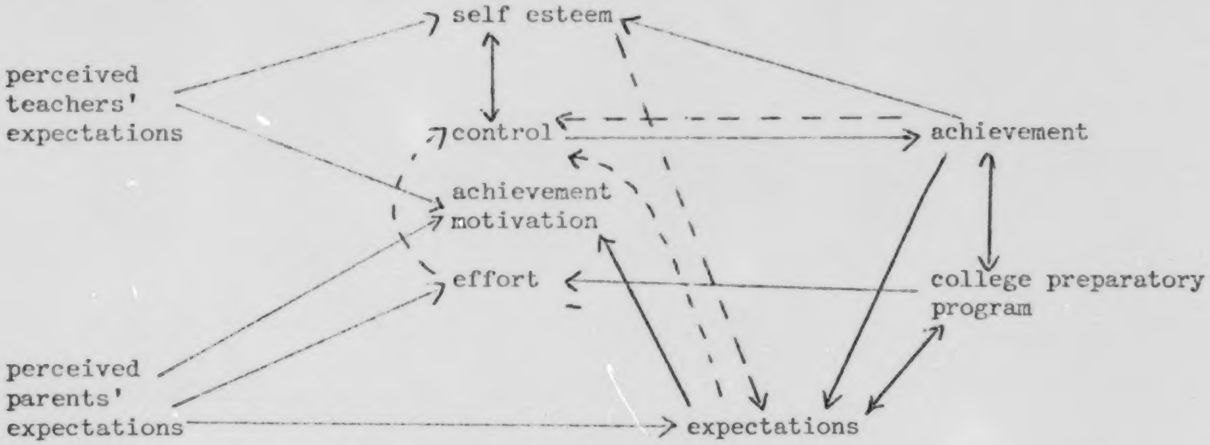

self esteem
-
perceived teachers' expectations
control*
achievement
achievement motivation*
effort*
college preparatory program
perceived parents' expectations
expectations*

FIGURE VII. 7 FINAL WHITE ENDOGENOUS STRUCTURE

9th Grade EEOS



12 Grade EEOS



12th Grade NLS

self esteem

perceived teachers' expectations

control

achievement

achievement motivation

effort

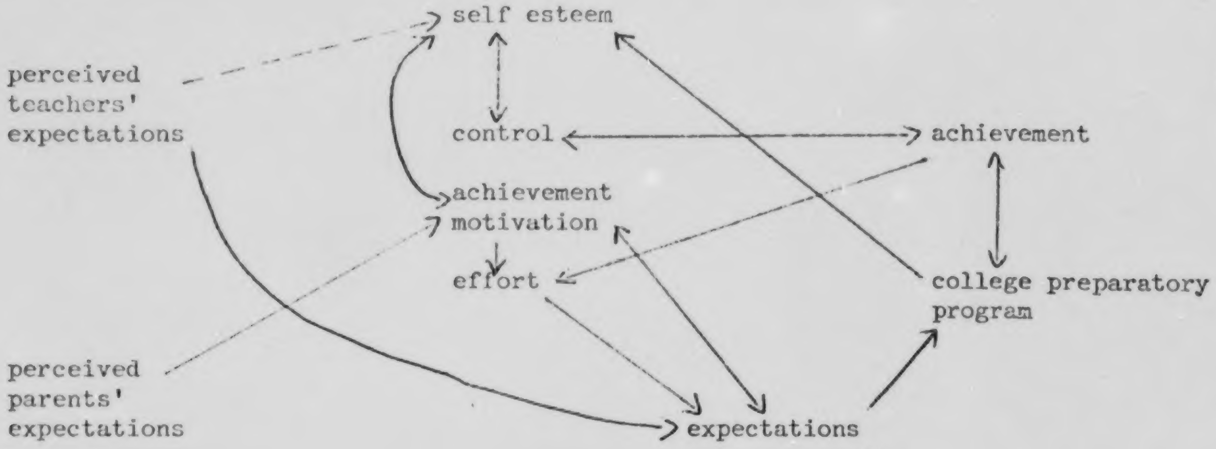
college preparatory program

perceived parents' expectations

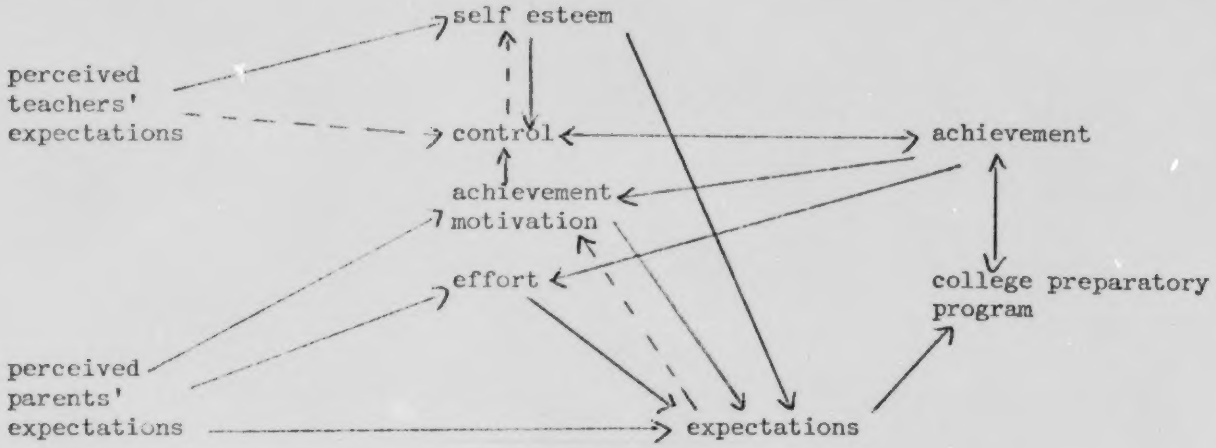
expectations

FIGURE VII. 8 FINAL ASIAN AMERICAN ENDOGENOUS STRUCTURE

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

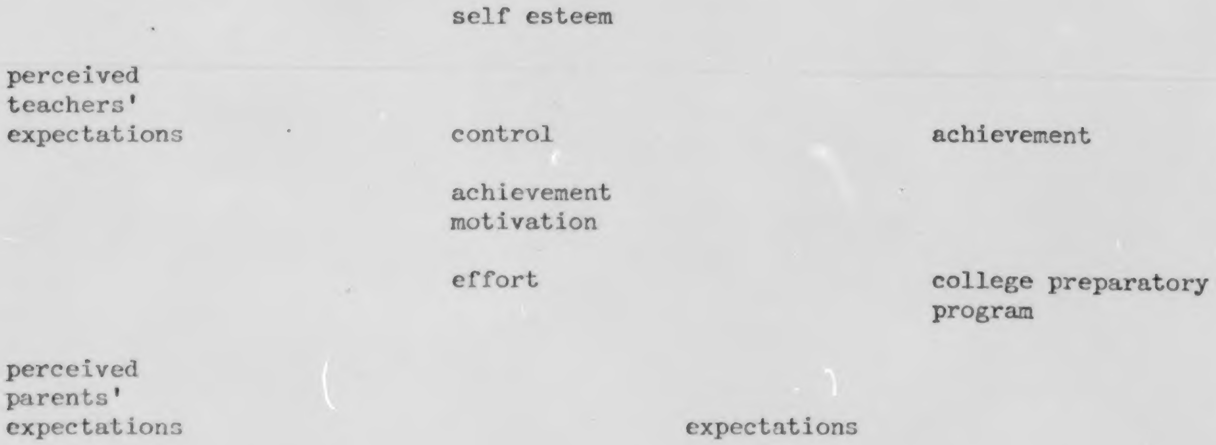
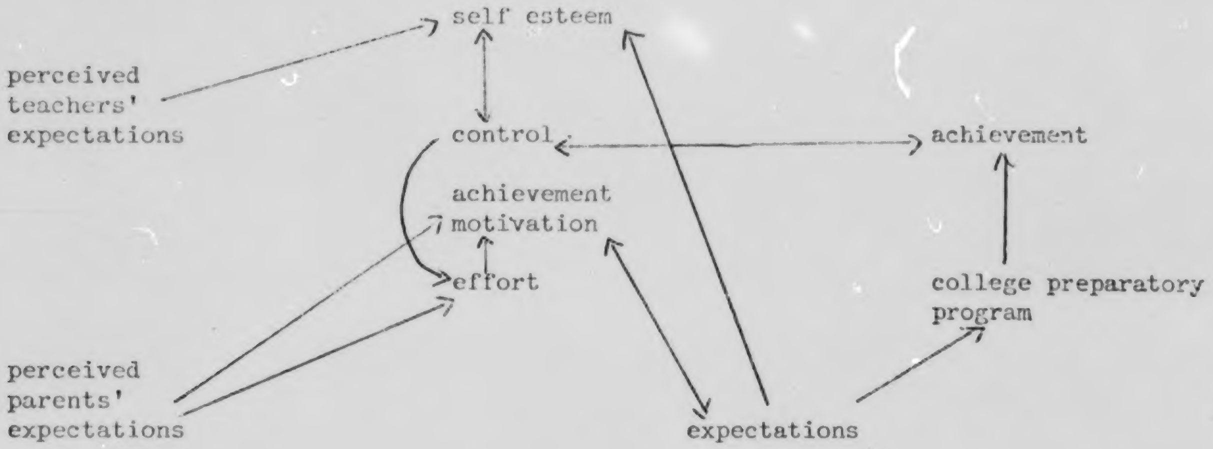
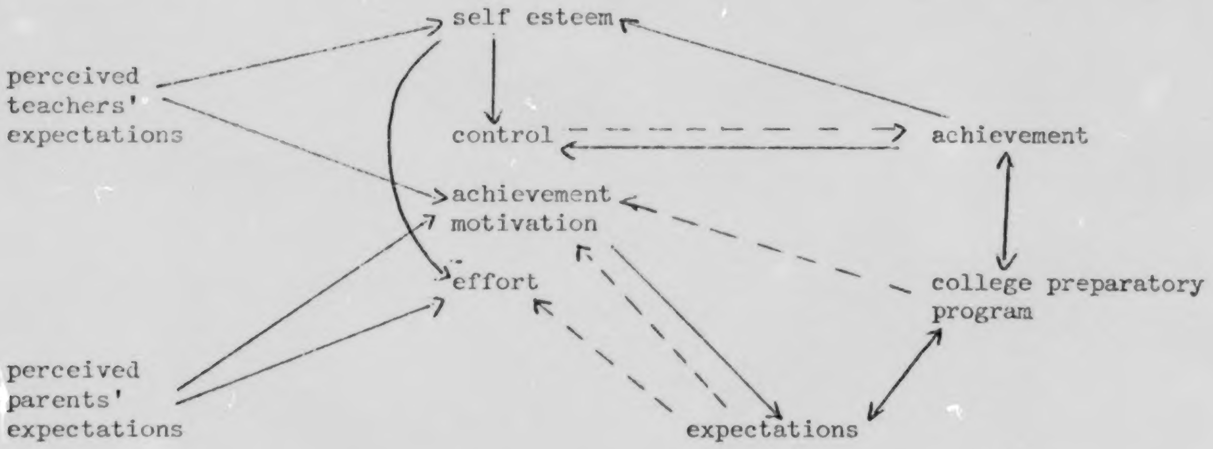

self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

FIGURE VII. 9 FINAL NATIVE AMERICAN ENDOGENOUS STRUCTURE

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

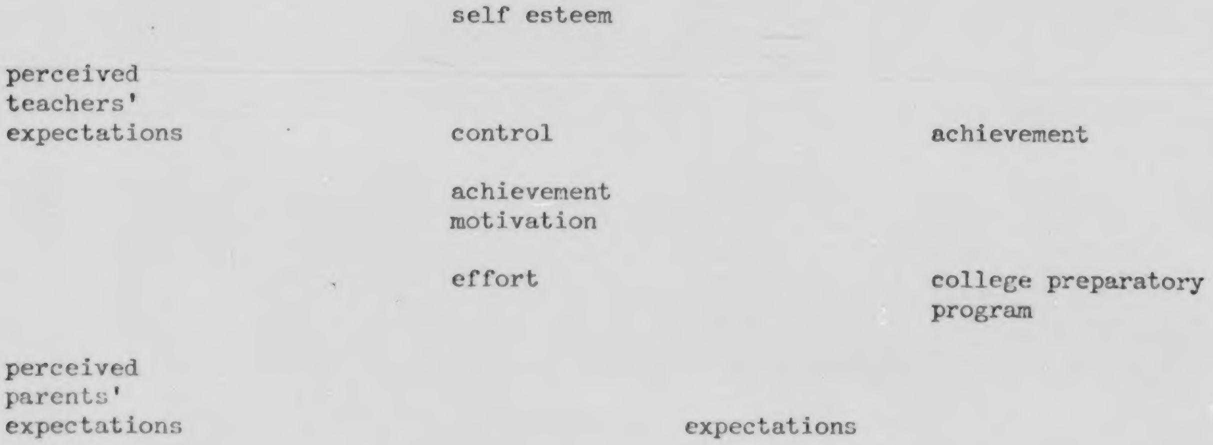
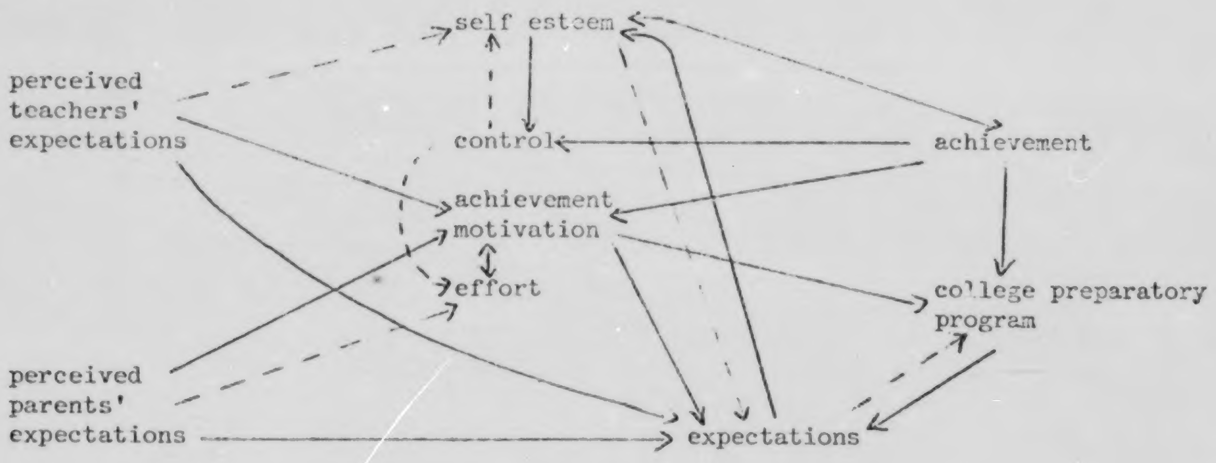
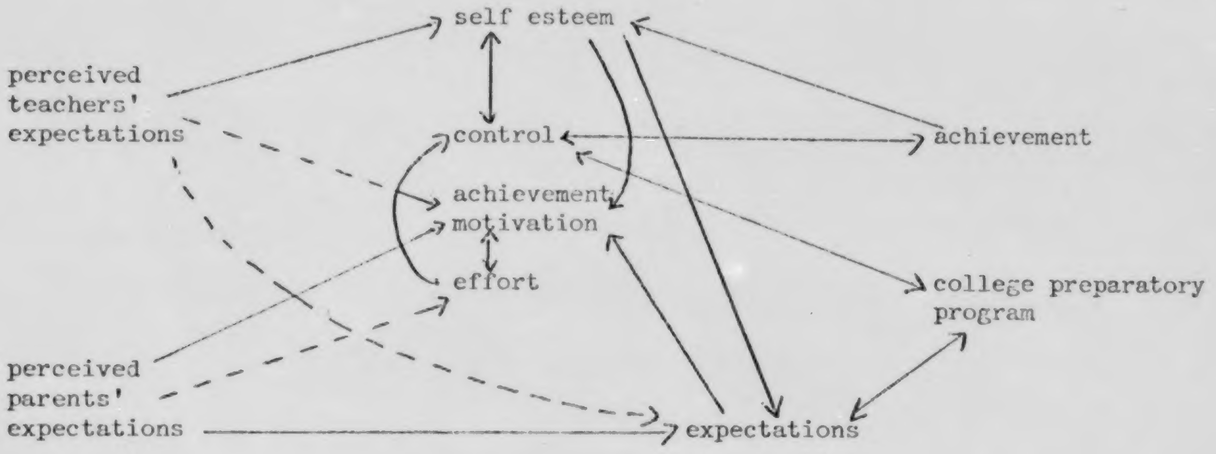

self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

FIGURE VII. 10 FINAL MEXICAN AMERICAN ENDOGENOUS STRUCTURE

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

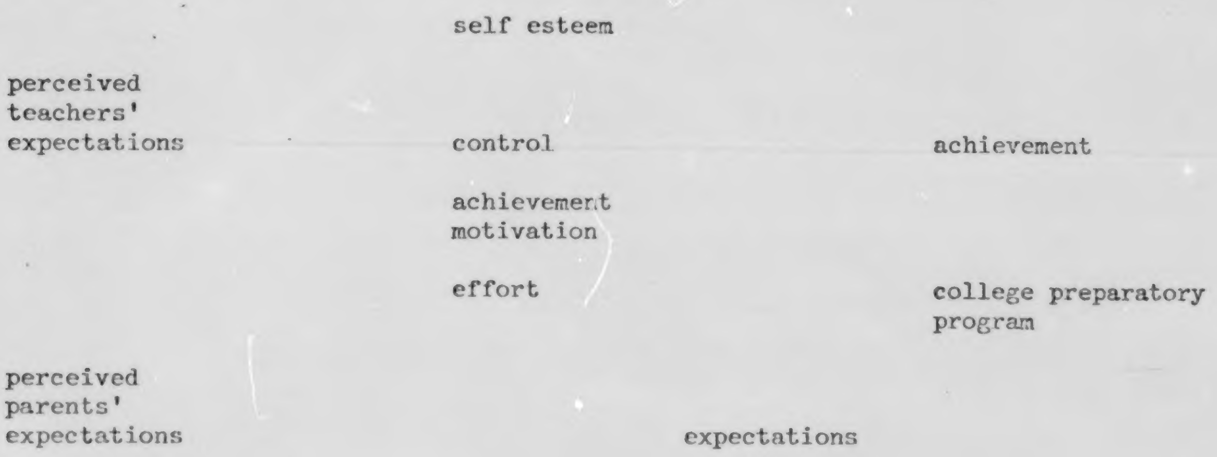
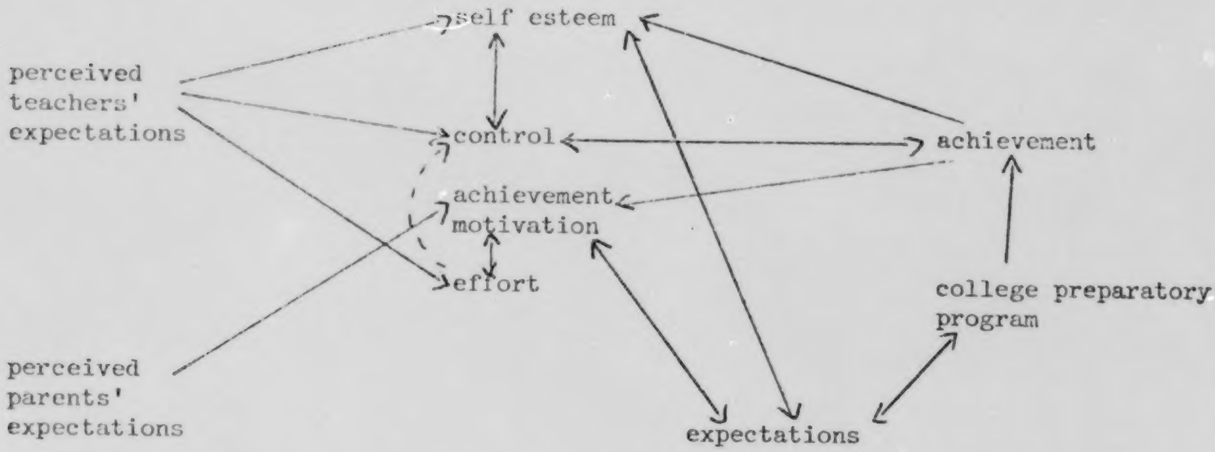
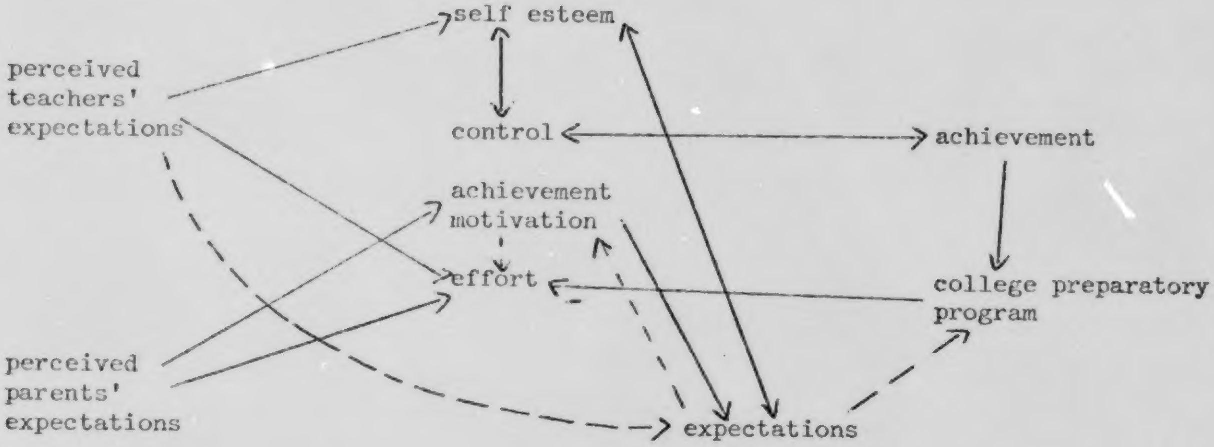

self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

FIGURE VII. 11 FINAL PUERTO RICAN ENDOGENOUS STRUCTURE

9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS

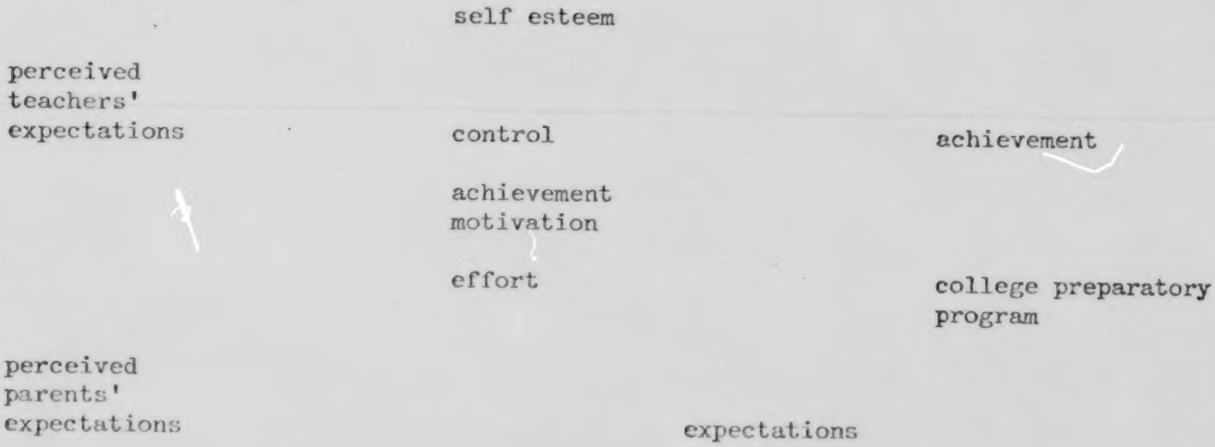
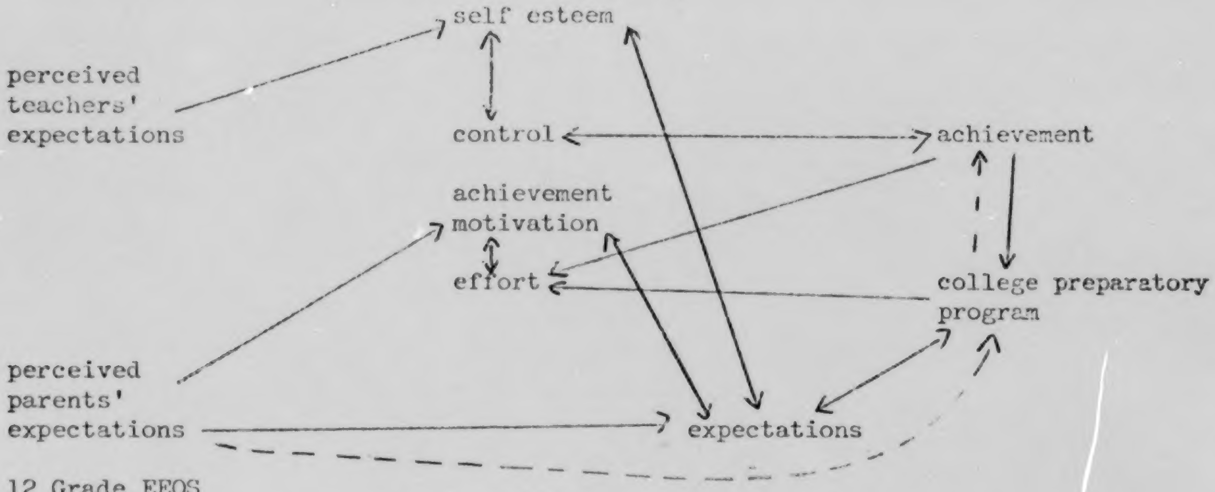
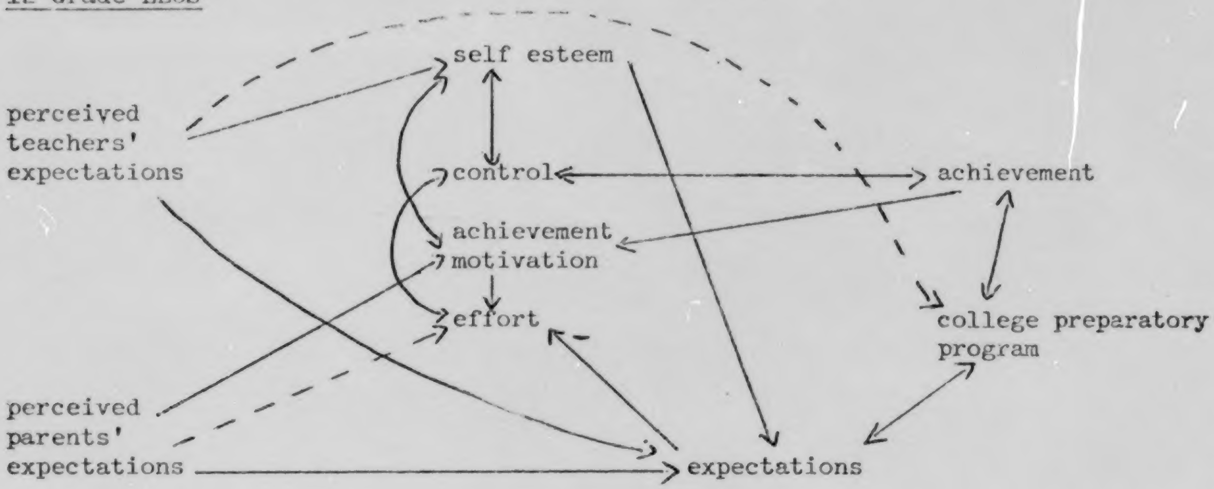

self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

FIGURE VII. 12 FINAL BLACK ENDOGENOUS STRUCTURE

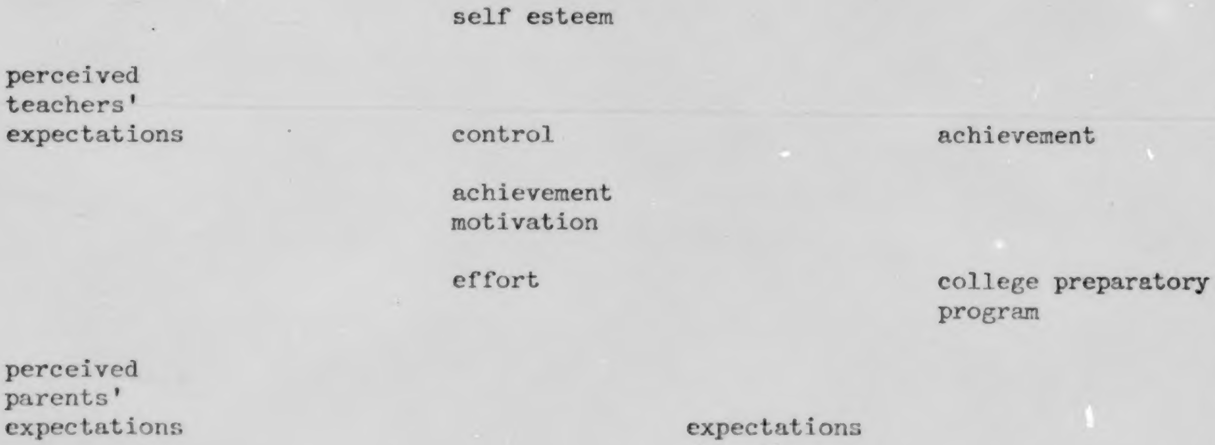
9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

COMPARISON OF MINORITY ENDOGENOUS STRUCTURE WITH WHITE ENDOGENOUS STRUCTURE

In this section we compare the white endogenous structure with the endogenous structures of the minority groups. In the final 12th grade EEOS model for whites there are 20 significant relationships among the endogenous variables, i.e. t-statistics greater than unity in absolute value. For the 9th grade EEOS data there are 18 significant relationships. In table VII.1 we present the percentage of these relationships that exist for the minority groups. For example, for 12th grade blacks 14 out of the 20 relationships or 70 percent of the relationships are present. We see that at least half of the relationships are present for all groups at all grade levels. Mexican Americans have the most similar relationships to the whites, followed by blacks. Asian Americans, Native Americans and Puerto Rican Americans are the most different to the whites.

The relationships that are present for all groups appear in Figure VII.13. An unbroken line indicates that the relationship is significant (at 0.14 level) for the six ethnic groups and a broken line indicates that the relationship is significant for 5 out of the 6 groups. The figure shows clearly that achievement and the ability to control one's environment are jointly derermined. Expectations are an improtant determinant of participation in a college preparatory program. Perceived parents' expectations are major determinants of achievement motivation and perceived teachers' expectations are a major determinant of self esteem.

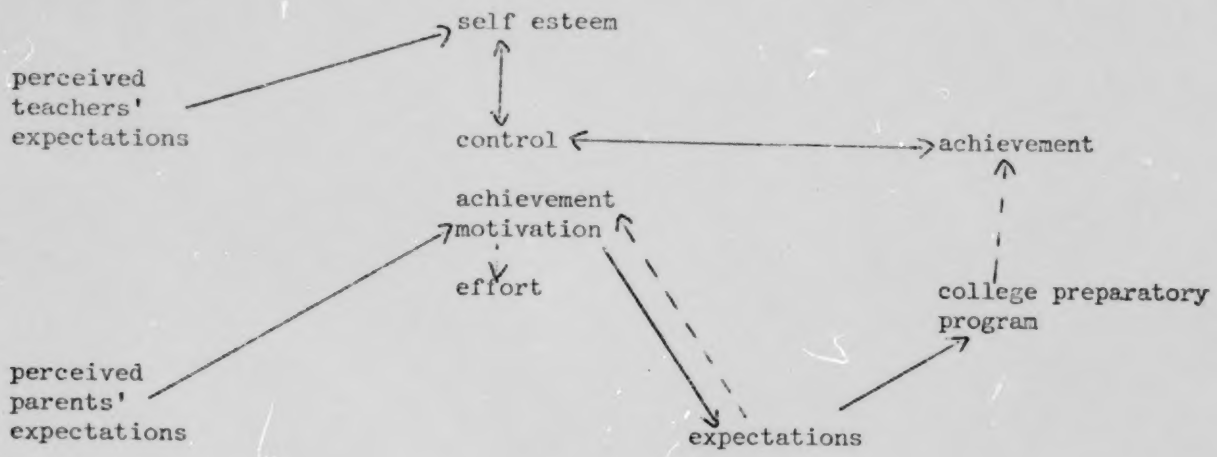
Table VII. 1

Similarities with white structure as a percentage of number of relationships in white structure

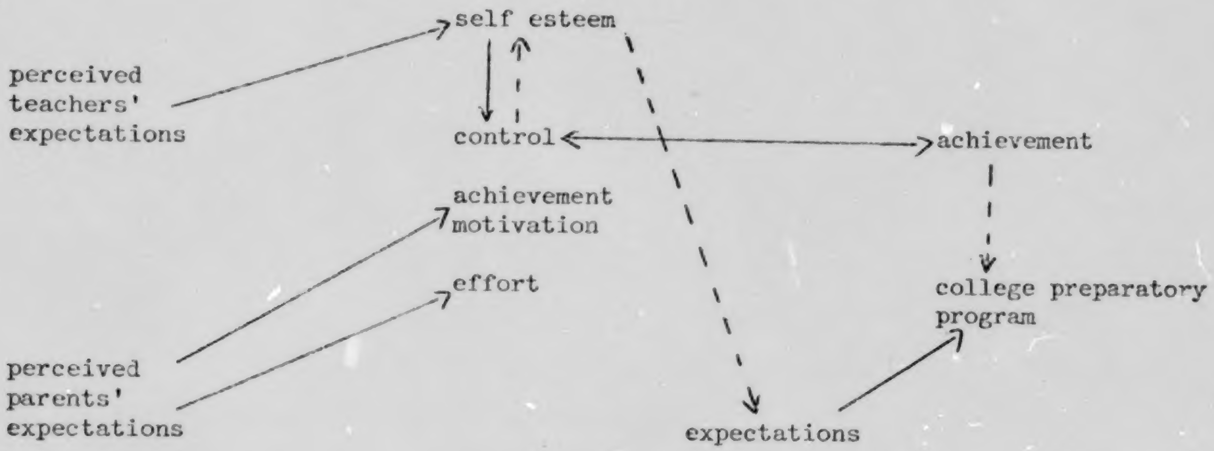
	12th Grade	9th Grade
Asian American	65	50
Native American	65	50
Mexican American	70	72
Puerto Rican American	55	56
Black	70	56

FIGURE VII. 13 : RELATIONSHIPS THAT ARE PRESENT FOR ALL ETHNIC GROUPS

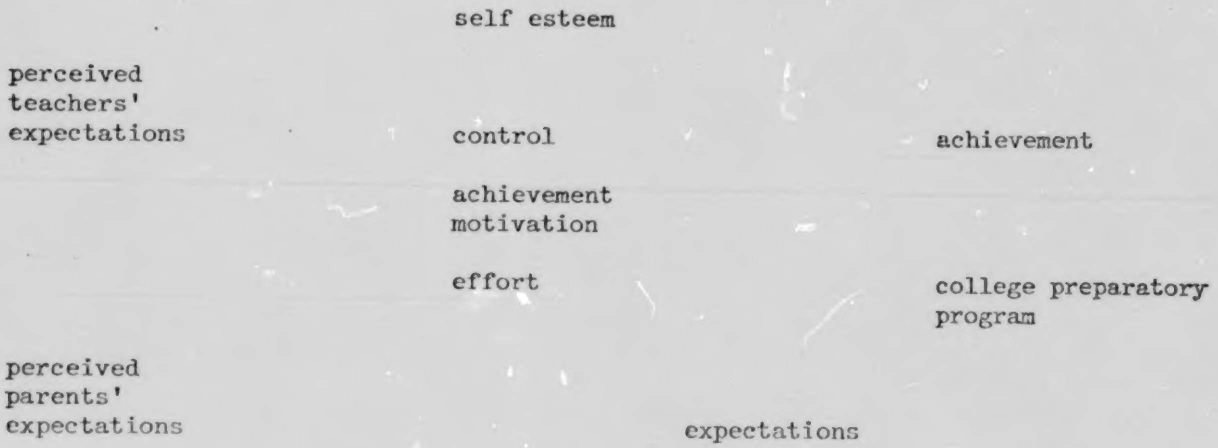
9th Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12 Grade EEOS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

12th Grade NLS


self esteem
perceived teachers' expectations
control
achievement
achievement motivation
effort
college preparatory program
perceived parents' expectations
expectations

ROBUSTNESS OF THE ENDOGENOUS STRUCTURE

In this section we examine the robustness of the endogenous structures for each of the ethnic groups. For each group we compute the number of relationships that exist using the 9th grade EEOS data as a percentage of the relationships that exist using the 12th grade EEOS data. For each ethnic group at the 9th grade two models are estimated: one is exactly the same as the 12th grade model and the other is the final 9th grade model including only significant variables and excluding all insignificant variables. We would expect that the former comparison to be more similar to the 12th grade model than the latter comparison.

Table VII. 2 contains the results. For whites, for example, there were 20 significant relationships among the endogenous variables for the 12th grade. When this model was tested on the 9th grade data 18 of them or 90 percent were significant. Of the 20 original relationships 15 of them or 75 percent were still present in the final 9th grade model. For Asian Americans 19 relationships were significant in the final 12th grade model and of these 19 or 68 percent were significant when the model was tested in the 9th grade data. In general the relationships appear to be very robust. Whites seem to have the most robust model, followed by Puerto Rican Americans, Mexican Americans, Native Americans, Asian Americans and Blacks. While the final 9th grade model differs more from the final 12th grade model than does the initial test of the 12th grade model on the ninth grade data, the final ninth grade model remains quite similar to the final 12th grade model. These results are rather encouraging and do suggest that at least some of the empircial relationships are robust and merit careful, future examination.

Table VII. 2: Robustness of each model: The percentage of 12th grade endogenous relationships that occur in 9th grade data

	Test of 12th grade model	Final 9th grade model
White	90	75
Asian American	68	68
Native American	71	65
Mexican American	76	76
Puerto Rican American	82	71
Black	64	59

SECTION VIII

AN ANALYSIS OF THE REDUCED FORM ACHIEVEMENT EQUATION FOR THE EEOS AND NLS DATA

Because so much previous emphasis has been placed on pupil achievement, in this section we examine the variables that affect achievement using the 9th and 12th grade EEOS data and the 12th grade NLS data. For each ethnic group we estimate two achievement equations: the structural form equations which measure the direct effect of a variable on achievement and the reduced form equations which measure the total effect of a variable on achievement. In this section we discuss the reduced form equations. For the 12th grade EEOS data the reduced form and structural form equations are presented in Appendix V.

The results of this section extend section III. The format is exactly the same, and the following tables are updates of Table III. 1 through III.4. Some minor modifications to the results presented in these tables are made, but the results do not differ significantly. The major difference is that we have now included the results for the NLS data. Since the NLS data contain only individual pupil characteristics the only table that changes substantively is the first one.

The results for the NLS data confirm our previous conclusions. They stress the importance of age, socioeconomic status, and information in the home. The only result that differs from the analysis of the 12th grade EEOS data is for sex, which is frequently insignificant in the NLS data, and for whites the coefficient suggests that girls have higher achievement than boys, after controlling for all other variables. This finding suggests that sex biases in American education may be diminishing.

The additional data from the NLS analysis is for religious affiliation. For native Americans, Mexican Americans and Puerto Rican Americans there appears to be little significant difference among the achievement levels of students with different religious affiliations. For the white students Protestants, Catholics, Jews and students with no religious affiliation have higher achievement levels than other white Christians and whites with other religious affiliations, after controlling for all other variables. For black students, Protestants and Catholics have higher achievement levels than other Christians, Jews, and students with no religious affiliation, who, in turn, have higher achievement levels than black students with no religious affiliation, after controlling for all other variables.

The key to Tables VIII is as follows:

NS	$\|t\| \leq 1.645$
+, -	$1.645 < \|t\| \leq 5.0$
++, --	$5.0 < \|t\| \leq 10.0$
+++, ---	$10.0 < \|t\|$
...	not included

Table VIII.1 Total Effects of Home and Individual Variables On Achievement: 9th grade EEOS (9EOS), 12th grade EEOS (12EOS), 12th grade NLS (12NLS)

Variable Name	White 9EOS	White 12EOS	White 12NLS	Asian American 9EOS	Asian American 12EOS	Asian American 12NLS	Native American 9EOS	Native American 12EOS	Native American 12NLS
SEX	NS	--	+	NS	NS		NS	-	NS
AGE	---	--	---	NS	-		--	-	-
SES	+++	+++	+++	++	+		++	+	+
PAINC	...	...	++	...	...		...	...	+
INFO	++	+++	++	+	++		NS	NS	NS
TWOP	+	NS	...	+	+		+	NS	...
NOBAS	-	--	...	-	-		-	-	...
FL	NS	NS	...	-	NS		+	NS	...
RBS	++	+	...	NS	NS		+	NS	...
PTAAT	NS	-	...	NS	NS		NS	-	...
PTAS(PARDIS)	NS	NS	++	+	+		NS	NS	NS
TC	-	-	...	+	+		NS	NS	...
NTCHSCL(TRANSFER)	-	-	NS	NS	NS		NS	NS	NS
LSTCHSCL(DURRES)	+	+	NS	NS	+		NS	NS	NS
NTLKGC(COUNS)	+++	+	+	++	+		++	NS	NS
NHWTV	-	--	...	NS	NS		+	NS	...

Table VIII.1 Total Effects of Home and Individual Variables On Achievement: 9th grade EEOS (9EOS), 12th grade EEOS (12EOS), 12th grade NLS (12NLS)

Variable Name	White			Asian American			Native American		
	9EOS	12EOS	12NLS	9EOS	12EOS	12NLS	9EOS	12EOS	12NLS
PROTSTNT	...	...	+++	...	...		...	...	+
CATHOLIC	...	...	++	...	...		...	...	NS
OTHRCHRS	...	...	+	...	...		...	...	NS
JEWISH	...	...	++	...	...		...	...	NS
OTHREL	...	...	NS	...	...		...	...	NS
NOREL	...	...	++	...	...		...	...	NS

Table VIII.1 Total Effects of Home and Individual Variables On Achievement: 9th grade EEOS (9EOS), 12th grade EEOS (12EOS), 12th grade NLS (12NLS)

Variable Name	Mexican American			Puerto Rican			Black		
	9EOS	12EOS	12NLS	9EOS	12EOS	12NLS	9EOS	12EOS	12NLS
SEX	NS	-	NS	-	-	-	-	-	NS
AGE	--	--	--	--	-	NS	--	-	--
SES	++	+	NS	++	+	+	+++	++	+
PAINC	...	...	NS	...	...	NS	...	...	++
INFO	NS	+	+	+	NS	NS	NS	+	++
TWOP	+	+	...	+	NS	...	+	NS	...
NOBAS	--	-	...	-	-	...	-	--	...
FL	-	--	...	--	NS	...	NS	-	...
RBS	+	+	...	+	NS	...	+	NS	...
PTAAT	-	-	...	-	-	...	-	-	...
PTAS(PARDIS)	NS	+	+	NS	+	+	+	+	+
TC	+	NS	...	++	+	...	+	+	...
NTCHSCL(TRANSFER)	NS	+	-	NS	+	NS	NS	NS	--
LSTCHSCL(DURRES)	+	+	-	+	+	+	+	+	NS
NTLKGC(COUNS)	+++	+	NS	+++	++	NS	+++	++	+
NHWTV	NS	NS	...	+	NS	...	+	NS	...

Table VIII.1 Total Effects of Home and Individual Variables On Achievement: 9th grade EEOS (9EOS), 12th grade EEOS (12EOS), 12th grade NLS (12NLS)

Variable Name	Mexican American			Puerto Rican			Black		
	9EOS	12EOS	12NLS	9EOS	12EOS	12NLS	9EOS	12EOS	12NLS
PROTSTNT	...	...	NS	...	...	NS	...	...	++
CATHOLIC	...	...	NS	...	...	NS	...	...	++
OTHERCHRS	...	...	NS	...	...	+	...	...	+
JEWISH	...	...	+	...	...	NS	...	...	+
OTHREL	...	...	NS	...	...	NS	...	...	+
NOREL	...	...	NS	...	...	NS	...	...	NS

Table VIII.2 TOTAL EFFECTS OF SCHOOL COMPOSITION VARIABLES ON ACHIEVEMENT

Variable Name	White		Asian American		Native American		Mexican American		Puerto Rican		Black	
	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS
AVSES	++	NS	NS	NS	+	NS	++	+	++	+	++	+
PWPICLY	+	+	NS	+	NS	NS	-	-	NS	-	NS	-
PWPICLY2	-	-	NS	-	NS	NS	+	+	NS	NS	NS	+
PWHITE	NS	NS	NS	NS	NS	NS	+	+	+	NS	NS	-
PWHITE2	NS	NS	NS	NS	NS	+	-	NS	-	NS	NS	+

TABLE VIII.3 TOTAL EFFECTS OF TEACHER VARIABLES ON ACHIEVEMENT

Variable Name	White		Asain American		Native American		Mexican American		Puerto Rican		Black	
	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS
TAVR	NS	NS	NS	+	+	NS	+	+	NS	+	+	+
NTPRPUP	+	NS	NS	NS	+	NS	+	NS	+	NS	+	NS
TANYTCH	NS	NS	-	NS	+	NS	NS	NS	-	NS	NS	+
PWTCHLY	+	+	+	NS	+	+	+	+	NS	+	+	+
TASEX	NS	NS	+	+	NS	NS	NS	NS	-	NS	NS	NS
TPTC	NS	NS	+	NS	NS	NS	-	NS	NS	NS	NS	NS
TPADTN(TAPB9)	NS	NS	NS	NS	+	NS	+	+	NS	NS	NS	NS

Table VIII.4 TOTAL EFFECTS OF SCHOOL FACILITY AND OTHER VARIABLES ON ACHIEVEMENT

Variable Name	White		Asian American		Native American		Mexican American		Puerto Rican		Black	
	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS	9EOS	12EOS
FACILITS	-	NS	NS	NS	-	-	-	NS	NS	-	+	NS
PROBLEMS	+	NS	+	+	+	NS	+	NS	NS	NS	-	NS
AGES	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TEST	NS	+	NS	...	NS	NS	-	NS	-	NS	NS	NS
PRPCPREP	NS	+	+	NS	+	+	NS	NS	+	+	+	+
NTCHLV	NS	NS	+	NS	NS	+	NS	+	NS	+	+	NS
PRNMADG	-	NS	NS	-	NS	NS	NS	-	NS	NS	-	-
SMSA	-	NS	NS	NS	-	-	NS	NS	NS	NS	NS	NS

SECTION IX

POLICY MODELS FOR THE MANAGEMENT OF STUDENT ACHIEVEMENT AND OTHER EDUCATIONAL OUTPUTS

by

Anthony E. Boardman

Revised and published in Tims Studies in the Management Sciences, 8, 1978, 99-122.

Policy Models for the Management of Student Achievement and Other Educational Outputs

by

Anthony E. Boardman
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Abstract

This paper considers the cost-effectiveness of a number of strategies for attaining specified minimum levels of pupil achievement, achievement motivation, demonstrated motivation, self esteem, internal control and expectations. Strategies considered include hiring teachers with different verbal ability, experience, race and sex, and changing the teacher-pupil ratio. Costs are minimized subject to input variable constraints and production function constraints. In general, the optimal allocations are quite similar to existing allocations except that class sizes seems too small at present. Policies are much more cost-effective for minority group students than for Whites. If educational administrators aim to maximize achievement without regard to other educational outputs then improving the verbal ability of teachers is much more cost-effective than increasing teacher's experience or decreasing class size. For the combined sample, production possibility frontiers are estimated. Achievement and internal control are complements, while achievement and achievement motivation are substitutes.

Policy Models for the Management of Student Achievement and Other Educational Outputs[*]

1. Introduction

To a large extent the managers of schools and school systems are educators who possess little formal training in the techniques of economics and management science. While school superintendents and administrators may run school systems quite well, they are often accused of mismanagement and cost overruns. Since almost five % of the G.N.P. finances elementary and secondary education, the cost of mismanagement may run into millions of dollars each year. Unfortunately, economists and management scientists have provided school managers with little practical help.

Economists who work in the field of education have concentrated on estimating "educational production functions." Usually these functions relate a set of inputs including home background and school characteristics to one output-pupil achievement. This research is important for determining what factors or policies do make a difference. While this research is useful to the school administrator, he really wants to know which are the most efficient policies. Some economists have also estimated cost functions. By combining production functions with cost functions one can consider the cost-effectiveness of alternative educational policies. Surprisingly, there has been virtually no research in this area.[1] When school managers turn to educators and management scientists for help, they are inevitably disappointed.

Obvious reasons explain the paucity of planning models at the individual school level.[2] First, there is no general agreement on the set of educational outputs. Achievement is an important output but education produces more than achievement. Second, no theory relates the inputs to the outputs; theory does not specify the arguments or the functional form of the production function. At the same time, empirical estimations of production functions have reached inconsistent conclusions. Third, there is no general agreement on the set of educational inputs. Production function studies show that teacher characteristics and school characteristics do make a difference. However, these studies use surrogate variables, such as, teacher's verbal ability and experience instead of teacher's classroom behaviors and attitudes. The effects of teacher's behaviors and attitudes have not been carefully researched due to lack of suitable, available data. Fourth, few economists have estimated cost equations.[3] With all of these problems Cohen and Garrett's [5] argument that educational research has little effect on policy is hardly surprising.

Despite these problems this paper investigates the cost-effectiveness of a number of educational policies. While one must consider the conclusions with reservations, the approach should prove useful to future analyses that benefit from better, more recent data. The following section considers the case of a single educational output, achievement. In that section, costs are minimized subject to a single production function constraint. The cost effectiveness of alternative policies is investigated. In section 3 the constraint set is expanded to include multiple production functions.

Basically, sections 2 and 3 concern the minimization of costs subject to production function constraints. Sections 4 and 5 consider the equivalent problem of maximizing the outputs subject to the cost constraint. Since it is difficult to assign utilities or values to each educational output, the main purpose of section 5 is to determine the degree to which specific educational outputs are substitutes or complements. No previous research has addressed this problem with a similar set of outputs.

2. A Cost-Effectiveness Model for Pupil Achievement

The purpose of this section is to determine the most cost-effective method to improve pupil achievement. The problem is to determine the least expensive method of obtaining a given level of achievement. The objective is to minimize a cost function subject to a production constraint. The first part of this section considers the production function, the second part considers the cost function, and the final part considers cost-effectiveness. This section closely parallels Levin [14]. However, I use a production function based on individual students, include more teacher characteristics, but reach a similar major conclusion. Obtaining and retaining teachers with high verbal ability is much a more cost-effective strategy for improving pupil achievement than is obtaining and retaining teachers with experience.

The production function

For the purpose of this study I postulate that the educational production function takes the following form:

$$\mathrm{ACH}_i = (\mathrm{DEMOG}_i,\ \mathrm{SES}_i,\ \mathrm{PEERS}_i,\ \mathrm{TCHRS}_i,\ \mathrm{SCHOOL}_i),\ (i = 1, 2, \ldots, n) \qquad (1)$$

where, ACH_i represents the achievement of the ith student,

$DEMOG_i$ represents a vector of demographic characteristics, such as, sex, age and ethnic group of the ith student,

SES_i represents a vector of home background characteristics, such as, socio-economic level of parents, both parents alive and number of older siblings of the ith student,

$PEERS_i$ represents a vector of peer group characteristics, such as, peer group socio-economic level, and the racial or ethnic composition of the school and classroom of the ith student,

$TCHRS_i$ represents a vector of teacher characteristics, such as, ability, experience, sex, and race of the ith student,

$SCHOOL_i$ represents a vector of school characteristics, such as, school facilities, problems in the school, classroom size of the ith student.

Recently, Levin [13], Boardman et al [4] and other economists have argued that the educational process consists of multiple outputs and that these outputs affect and are simultaneously affected by achievement. In a structural form model these additional outputs would appear as arguments of the above production function. The structural form is of particular interest to educators, sociologists and psychologists because this form provides a better understanding of the processes involved with cognitive and affective development in school. Here, however, we are interested in policy and from this point of view we are primarily interested in the reduced form equation presented above.[4] The following section considers multiple outputs.

Usually, economists assume that the isoquants are strictly convex and the production function is strictly concave. Without these assumptions and with only a single production function, the optimal solution to the cost minimization problem will inevitably be a corner solution. For this research, however, I assume that the production functions are linear.

The sample for this study consists of twelfth grade students from the Equality of Educational Opportunity's [6] sample survey, EEOS. The sample consists of about four thousand Blacks, four thousand Whites, and all of the students in the additional racial and ethnic groups. The unit of analysis for estimating the production function is the individual student. Student composition, teacher and other school related variables are based on school averages or come from the school principal's responses. In total, the production function contains forty-eight exogenous variables.[5]

For the purpose of this present study we are not specifically interested in the pupil demographic and home background variables because these variables are out of the control of the educational managers. Basically, school administrators can reassign or bus students in order to change the socio-economic and racial characteristics of the students body, hire (rarely fire) and assign teachers, or improve the quality of the school facilities and environment. In this research I will not consider school composition variables since I have no wish to address the bussing issue which, at present, is in the hands of the courts not educators. Most production function studies find that school facility variables are insignificant and I shall not discuss them. Of the teacher characteristics, some are insignificant, including the degree level of the teacher, and they are excluded from the production function. The five remaining variables of interest are: teachers' average verbal ability, teachers' average number of years teaching (experience), the proportion of white teachers, the proportion of female teachers and the number of teachers per pupil in the class. All of the other variables are included in the regression but are not discussed because they are unnecessary for the major purpose.

Table 1 contains descriptions of the variables of interest. Achievement is an index constructed from the first component of a principal component analysis. Variables are listed in descending order of importance; those with the highest loading come first.

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Table 1 about here

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Cronbach's α[8], in parenthesis, provides an estimate of the lower bound of the "true reliability." An index is more difficult to interpret than a score of the number of correct answers on a test. However, previous research by Katzman [10] and Boardman et al.[3] suggests that scores on different achievement tests are complements and the more interesting part of this paper compares achievement with distinct outputs.

Table 2 contains the means of the variables by race and ethnic group.[6] It is interesting to note that Whites and Asian Americans (Orientals) have the highest achievement scores followed by Native Americans (American Indians), Mexican Americans, Puerto Ricans and

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Table 2 about here

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Blacks. At the same time, the quality of teachers' resources in schools attended by White and Asian Americans is, in general, higher than the quality in schools attended by other students.

The achievement production function estimates appear in Table 3. In fact, the production functions for the individual racial and ethnic groups include forty-two exogenous variables. The production function for all students includes six additional dummy variables, one for each ethnic and racial group. The table contains only the coefficients of interest for this paper.

An inspection of Table 3 shows that the achievement scores of Puerto Ricans and Asian Americans depend more on teacher characteristics than do the achievement scores of Mexican Americans, Blacks, Native Americans and Whites, in descending order of dependency. Since some variables appear to have a positive effect for some groups and a contrary effect for other groups, improvements may be made in the achievement levels of all students by redistributing teachers. For example, experienced teachers should teach Puerto Ricans, Mexican Americans and Whites while inexperienced teachers should teach Asian Americans and Native Americans. Asian Americans should have non-white teachers while the other groups seem to achieve higher with white teachers. Puerto Ricans, Native Americans and Whites should have male teachers while Asian Americans, Mexican Americans and Blacks should have female teachers.

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Table 3 about here

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The Cost Function

Most school districts pay teachers according to a well defined schedule that depends on experience (years of teaching) and the highest attained degree. In Philadelphia, in 1975 for example, teachers received a base salary of approximately $8,829 per annum. They received approximately an additional $711 for each year's experience for the first eleven years, $568 if they have a master's degree, $1,490 for a master's degree plus thirty credits, and $2,388 for a doctorate.[7] The average salary equals $14,124.

Salary does not depend explicitly on teacher's verbal ability, sex, race or any other variable that may enter the achievement production function. One may wonder, for example, if teachers with a high verbal ability are "free" for the school district. Clearly, this is not the case. Unless verbally able teachers are paid a sufficiently high salary they will seek and probably obtain an alternative job that pays more than teaching. There is an implicit price for verbal ability and other teacher characteristics. Thus far only Levin [12] and Antos and Rosen [1] have estimated these costs. These estimates appear in the first two columns of Table 4. Levin's estimates are based on sixth grade teachers from a large, northeastern metropolitan area; Antos and Rosen's estimates are based on ninth grade teachers from all parts of the country. Since Antos and Rosen estimated their cost equations using dummy variables and statified their sample by race and sex, the estimates that appear in Table 4 are computed very approximately from their results. For additional verification, I also estimated cost equations using teachers of ninth grade students.

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Table 4 about here

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These results appear in the column three. The major difference between the estimates is that Levin obtains a much higher imputed cost of a unit of verbal ability. This result may obtain because Levin excludes teacher's highest attained degree level while Antos and Rosen and I do include this variable. My estimates come between Levin's and Antos and Rosen's estimates, and I will use them henceforth. In all cases the estimated cost equations contain more variables than those in Table 4, but they are not presented since they are unnecessary. The constant term is calculated by subtracting the estimated mean effect of the presented variables from the mean salary.

The cost function includes all variables that enter the production function execpt NTPRPUP, the number of teachers per pupil, which is the inverse of class size. Class size is a variable that school districts can manipulate. School districts with smaller class sizes, i.e. more teachers per pupil, will have higher average costs per class then will school districts with larger class sizes. The average salary of teachers equals $6,562 and the average class contains 23.117 students. Thus, providing one teacher per pupil would cost, on average, $6,562 x 23.117 = $151694. The cost to the school district of employing two teachers to teach separate classes of ten students costs twice as much as employing one teacher to teach a class of twenty students. This result assumes excess classroom capacity and willingness on the part of the teacher to accept the same salary to teach ten or twenty students. The latter assumption is unlikely to hold. As class sizes become smaller, the number of teachers per pupil increases, and teachers may be willing to accept a slight reduction in salary. Thus, the cost of increasing the number of teachers per pupil may not rise as rapdily as the above equation suggests. Instead of using the mean salary as a base, I use therefore the constant term in the above regressions. The cost associated with the number of teachers per pupil becomes \$5157.34 x 23.117 = \$133092. Even with this reduction in the cost of teachers per pupil, the results show that optimal class sizes are large.

All of the costs are based on the EEOS data which were collected in 1965. Since inflation has approximately doubled teachers' salaries in the last ten years, these costs are doubled. The resultant cost function appears in the last column of Table 4.[8]

Cost-Effectiveness

Given the objective of maximizing a single output, achievement, subject to a cost constraint, the most cost-effective policy can be determined easily by dividing the production function coefficients, the marginal physical products, by the corresponding costs. The result provides an estimate of the increase in output per unit cost. These numbers, multiplied by one thousand, appear in Table 5.

Table 5 about here

The table shows clearly that spending money to obtain teachers with a high verbal ability is a very beneficial strategy for improving the achievement levels of all students.[9] This strategy dominates increasing the number of teachers per pupil, i.e. decreasing class size,for all students. Also this strategy dominates increasing the number of white teachers for all students except Whites. Furthermore, and most importantly, this strategy dominates spending money to increase teachers' experience. In fact, increasing the experience of teachers of Asian American and Native American students may increase costs and simultaneously decrease achievement.

Sometimes the coefficient on TFEMALE is negative, which suggests that spending money to hire female teachers will reduce achievement. In fact, a negative coefficient for this variable means that if you spend less money on teachers' salaries you will obtain a higher proportion of females which will increase achievement.

Money spent on improving the quality of teachers of minority students is, in general, much more cost-effective than spending the money on the teachers of Whites. This result obtains particularly for money spent on improving teachers' verbal ability. For example, spending money to hire teachers with a high verbal ability will increase the achievement level of Puerto Ricans 8.7 times more than will spending the same amount of money to increase the achievement of Whites. One must remember that all hiring decisions take place at the margin. Since teachers have tenure, school districts cannot instantly fire teachers with undesirable characteristics and hire teachers with desirable characteristics. Thus, the benefits that may accrue from better hiring decisions may take a number of years to become evident.

3. Cost-Effectiveness and Multiple Educational Outputs

Setting up the problem

Clearly, schooling does more than produce achievement. While most economists have concentrated on estimating achievement production functions, Levin [13], Boardman et al. [2, 4] and others have recently estimated simultaneous-equation production functions. Simultaneous equations models of the educational process usually include five types of outputs: achievement, motivation, attitudes about oneself such as self esteem or sense of fate control, expectations, and perceptions of the attitudes of significant others. The major objective of simultaneous-equation estimation is to identify the causal relationships among the multiple outputs. This research is particularly useful to educators, sociologists and psychologists who wish to know more about the "process of education." In this paper, however, the focus is to provide specific policy suggestions, while recognizing that the educational process consists of multiple outputs.

Let us suppose that the school administrator attempts to minimize costs subject to the constraints that each output must be greater than some specified minumum. For this research I specify six educational outputs. The first, achievement, is defined above in Table 1. The other five are defined in Table 6. Achievement motivation reflects a student's wants and aspirations. Demonstrated motivation reflects how hard the student seems to try in order to achieve. Self esteem reflects a general feeling of worthiness; see, for example, Coopersmith [7]. Internal control reflects the extent to which an individual believes that he can effect what happens to himself as opposed to the belief that outcomes stem from luck or fate; see, for example, Rotter [15]. Expectations measure the socio-economic level that the student expects to attain, after he leaves school; they are distinct from aspirations. All indices are constructed so that as they increase it means that a student has more motivation, self esteem,

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Table 6 about here

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control and expectations. All indices correlate positively with each other and with achievement. The means appear in Table 7. While a student's perception of the attitudes of significant others are endogenous variables, they are less important than the other outputs and are unlikely to enter the school district's (implicit) utility function.

The optimization problem is seen best by examining Table 8, which presents the linear programming problem based on the total sample of data. The objective is to minimize costs subject to ten boundary constraints on the inputs and subject to six production level constraints. The cost function appears in Table 4. The first two constraints

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Table 8 about here

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state that teachers' verbal ability must be greater than zero and less than thirty. The third and fourth constraints state that teachers' experience must be greater than zero and less than thirty-five. The fifth and sixth constraints state that the proportion of white teachers must be greater than zero and less than unity. The seventh and eighth constraints state that the proportion of female teachers must be greater than zero and less than unity. The ninth and tenth constraints state that the number of teachers per pupil must be greater than 0.025 and less than 0.088, that is, class size must be greater than twelve and less than forty.

The eleventh constraint is an achievement level constraint. The coefficients on the left hand side of the inequality are estimates of equation 1 and also appear in Table 3. The number on the right hand side of the inequality is the expected level of achievement given the left hand side coefficients and the appropriate variable means which appear in Table 2. Thus, the number on the right hand side is the expected level of achievement given existing teachers' characteristics and assuming that the only variables that affect achievement are those on the left hand side of the inequality. The twelfth constraint is an achievement motivation constraint. The left hand side of the inequality consists of estimates of an achievement motivation production function equation. The equation is identical to the one used to estimate the achievement production function but, of course, achievement motivation is the dependent variable. The number on the right hand side is analogous to the number on the right hand side of the eleventh constraint. In this case the number equals the expected level of achievement motivation given the production function estimates on the left hand side of the inequality and the appropriate means from Table 2. Constraints thirteen through sixteen correspond to the demonstrated motivation, self esteem, internal control and expectations constraints, respectively, and are calculated analogously to the achievement constraint.

The production function constraints contain some interesting information. In general, the coefficients of the achievement equation are much larger than the coefficients of the other equations. This suggests that teachers' characteristics are much more important for affecting achievement than for affecting the other outputs. Secondly, the coefficients for teachers' experience, teachers' race and teachers' sex are positive in all constraints. Thus, ceteris paribus, students with experienced, white, female teachers will have higher scores on all of the outputs than will students with inexperienced, non-white, male teachers. Third, the coefficients for teachers' verbal ability and number of teachers per pupil vary across outputs. Ceteris paribus, students of teachers who have high verbal ability will have higher achievement and sense of control but lower achievement motivation, demonstrated motivation, self esteem and expectations than will students whose teachers have low verbal ability. Ceteris paribus, decreasing class size will increase achievement and demonstrated motivation but will lower the other outputs.

Table 8 and the above comments apply to a combined sample of all students. One may expect that the production functions differ among racial and ethnic groups. In order to perform the cost minimization problem separately for each group, the production function constraints, numbers eleven through sixteen, are replaced by the appropriate constraints for each group. These constraints appear in appendices 1 through 6.

Results

The optimal values of the inputs and the optimal costs appear in Table 9 for each racial and ethnic group and the total sample. The most striking result is that the optimal value of teachers' verbal ability is, for all groups except the Mexican Americans, approximately equal to the observed mean teachers' ability level. The optimal number of years teaching seems slightly higher than the actual mean number of years teaching. However, the cost function assumes that school districts should pay $152 for each additional year of experience while districts do pay approximately $711 for each additional year of experience.

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Table 9 about here

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Given the cost function, white teachers seem more cost-effective than non-white teachers for all groups except Asian Americans. Blacks, Asian Americans and Mexican Americans should have female teachers while Puerto Ricans, Native Americans and Whites should have male teachers. However, this latter result is sensitive to changes in the cost function. It appears that all classes are too small and that large cost savings can be achieved by increasing class size.

The optimal costs seem to depend considerably on teachers' experience. Thus the costs of educating Puerto Ricans who require teachers with many years experience is much higher than the cost of educating Mexican Americans. All costs are much lower than those observed in practice because the optimal class size is much higher than the observed mean. If, however, the number of teachers per pupil is increased from 0.025 to 0.0433 then costs increase by $4871. If this number is added to the optimal cost figures then they approximately equal the mean salary paid to Philadelphia teachers of $14124.

It is interesting to consider the values of the slack variables. These numbers appear in Table 10. The value of a slack variable indicates by how much the optimal output level exceeds the minimum. Thus a zero indicates that the constraint is binding. For all groups except the Asian Americans and Mexican Americans the

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Table 10 about here

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achievement constraint is binding. For these groups teachers should probably concentrate their efforts on improving achievement. For Asian Americans, teachers should try to improve self esteem and demonstrated motivation.

As Katzman [10] has indicated, there are a number of possible extensions of this research. One of the most interesting extensions is to estimate marginal cost equations for each output. If the aim is to estimate a marginal cost curve for achievement, all of the other output levels are fixed. Various output levels of achievement are specified and the minimum cost of obtaining each level is determined. Given the output levels and associated costs, the marginal cost is calculated straightforwardly. Of course, one can obtain a family of cost curves depending on the levels of the other output constraints.

Few economists have modelled the educational process with multiple outputs. Most concern focusses on pupil achievement. Suppose then that we remove the other production function constraints. The analysis of the previous section tells us that the most cost effective variables will tend towards their maximums while the other variables will tend to their minimums. For Blacks, for example, the optimal teachers' verbal ability equals 28.488, the optimal teachers' experience equals zero, the optimal proportion of white teachers equals zero, the optimal proportion of female teachers equals unity, and the optimal number of teachers per pupil equals the minimum of 0.025. In fact, teachers' experience and number of teachers per pupil attain their minimum for all groups. The minimum costs in order to achieve the given achievement score, without including the other production constraints, appear in the last column of Table 9.

Two major points emerge from minimizing costs subject to the boundary constraints and the achievement level constraint only. First, the optimal teachers' characteristics differ considerably from existing, mean teachers' characteristics. Second, considerable cost savings can occur. In fact costs per classroom could be cut by approximately 50% from their present level. This section suggests that school administrators do not aim to maximize achievement without regard to other educational outputs and I firmly believe that they should aim to produce more than achievement even though costs will be higher.

4. Achievement Maximization

In this section the objective becomes to maximize achievement. The cost function becomes a constraint and costs must be less than $14124, the average paid to Philadelphia's teachers. The input boundary constraints and the other five production function constraints remain unaltered.

The results of the achievement maximization problem appear in Table 11 and can be compared to Table 9. In general Teachers' verbal ability approaches the maximum and Teachers' experience becomes larger or smaller depending on the sign of coefficient in the achievement production function. Teachers' race and sex remain relatively unchanged. The major difference is that the number of teachers per

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Table 11 about here

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pupil increases i.e. class size decreases. The maximum attainable value of achievement (based only on teachers' characteristics) appears in the row labelled ACH. It is interesting to note that teachers' characteristics have the most effect on Asian Americans, followed by Puerto Ricans, Mexican Americans, Blacks, Native Americans and Whites. The next row contains the expected achievement level calculated from the production function estimates and the existing variable means; it also appears on the right hand side of the achievement constraint which is discussed in section 3. The difference between the maximum achievement level and the expected achievement level appears in the next row, labelled ΔACH.

It seems that the maximum achievement level that can be obtained by an optimal allocation of teachers' resources is little higher than the expected level given the current allocation of resources. However, this difference appears much larger when it appears as a standard deviation, σ, and becomes even larger when described as a percentage of the difference between the mean achievement score of whites and of each group, %ΔWHT. For example, providing Blacks with teachers with optimal characteristics at a cost of $14124 per annum and maintaining their levels of other outputs can increase the achievement scores of Blacks by approximately 40% of the existing difference between the mean achievement scores of Blacks and Whites. Remember that much of the difference in mean achievement scores between Blacks and Whites can be accounted for by socio-economic and home background differences. When viewed in this light, the improvements that can be made in achievement scores by providing Blacks with teachers who possess desirable characteristics is quite considerable.

5. Education Production Possibility Frontiers

When achievement is maximized subject to the cost constraint and the other constraints, the optimal values of the other outputs can be determined residually. In fact this is done straightforwardly by subtracting the values of the slacks, which are negative, from the means. One can proceed in a similar fashion to maximize each output in turn.[10] The results, based on the total sample, appear in Table 12.[11] This table is provided for illustrative purposes, the reader has sufficient information to perform this analysis on each group.

The first thing to look for is the difference between the output levels and the means of each output which appear in the last row. If the two numbers are equal then the constraint on that output is binding.

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Table 12 about here

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For example, maximizing achievement motivation, demonstrated motivation, self esteem or expectations is limited by the binding achievement constraint. However, achievement and sense of control are close complements, that is, employing teachers with characteristics that maximize achievement also produces a high level of sense of control and vice versa. Similarly, achievement motivation, demonstrated motivation, self esteem and expectations are complements. Maximizing one of these outputs also maximizes the others. For this analysis, costs were allowed to be very high, thus the output figures are far from the origin in the production space. If costs are more limited, these outputs will still be complements but not such perfect ones as this analysis suggests. One can obtain reasonably high levels of demonstrated motivation, self esteem, and to a less extent, expectations, and at the same time maintain high levels of the other outputs. However, increasing any one of these output levels beyond a certain point will seriously reduce achievement and control. It is quite clear that achievement is a substitute for achievement motivation; maximizing one of them tends to minimize the other. Perhaps the most important result is that policies aimed at maximizing achievement seem to provide reasonably high levels on all of the other outputs except achievement motivation.

6. Conclusion

This paper has considered the cost-effectiveness of a number of strategies for attaining specified minimum levels of educational outputs. The optimal levels of teachers' ability and experience are surprisingly similar to the actual average levels. The analysis suggests that increasing class size reduces slightly achievement and other output levels but results in significant cost savings. Here, of course, one must be careful because the analysis has assumed linear production functions and, in fact, very large class sizes may lower the educational outputs more than the linear formulation implies.

If school administrators aim to maximize achievement without regard to the other educational outputs then improving the verbal ability of teachers is much more cost-effective than increasing teachers' experience or reducing class size. Disregarding the other outputs means that teachers currently possess, on average, a set of characteristics that are far from optimal. Furthermore, hiring teachers with the optimal characteristics will result in very large cost savings. However, I believe that schools should produce more than achievement even though costs become higher.

One of the novel aspects of this paper is the attempt to determine the extent to which educational outputs are substitutes or complements. Achievement and sense of control are complements; achievement motivation, demonstrated motivation, self esteem and expectations are also complements. However, achievement and achievement motivation are substitutes. One must remember that these production frontiers are calculated on the basis of teacher inputs only. The addition of other variables may change the frontiers.

Finally, it is important to remember that caveats apply to most empirical studies and this one requires many cautious remarks. Errors can arise and surely exist in the production function estimates and the cost estimates. The model assumes that teacher's characteristics are independent while, in fact, school districts hire a teacher with a bundle of characteristics. Hiring decisions can only take place at the margin and the market for teachers has changed recently. Despite these problems, the approach followed in this paper should prove useful to managers of educational policy. When better, more recent data become available, the major implications of this research can be tested.

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Footnotes

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[1] The only good exceptions are those by Katzman [10] and Levin [14].

[2] For planning models at the national level see, for example, Correa and Tinbergen [8] and, at the university level, see Kumar and David [11].

[3] The only exceptions are by Levin [12] and Antos and Rosen [1].

[4] Suppose that the structural form and reduced form equations are linear. In this case, the structural form parameters measure the direct, marginal effect of a variable on the dependent variable; they are essentially partial derivatives. The reduced form parameters measure the direct effect plus all indirect effects; they are essentially total derivatives. In this research we are interested in the reduced form because we want to know the total effect of a variable change, after it has worked itself completely through the system.

[5] Due to space limitations I do not present or discuss all of the variables in the production function. The variables' descriptions and the entire production functions appear in Boardman et al. [2]. This latter paper provides more information about the sample and the variables. The production function is almost identical to the one presented in Boardman et al. [4] although the present sample excludes those students who had no access to a college preparatory program in their school.

[6] The total sample (last column) includes some additional students who did not clasify themselves in one of the listed ethnic or racial groups. These other students may be Eskimos, Aleuts or Samoans. Since we could not match each student with his actual teacher, the teacher characteristics are averages based on all teachers who teach at the twelfth grade in a school.

[7] These estimates are based on data in Facts and Figures, The Board of Education, The School District of Philadelphia, Pa., April, 1975.

[8] There are two major problems with this cost function. First, the market for teachers has changed dramatically during the last ten years. The supply of teachers has increased considerably so these cost figures may, in fact, overestimate the amount that school districts need to pay in order to obtain teachers with these characteristics. Secondly, these characteristics are not independent. A teacher comes with a "bundle" of characteristics; the school board cannot hire some characteristics without hiring the others. Finally one should remember that hiring takes place at the margin. One cannot change very much the flow of teachers charateristics from year to year since teachers have tenure.

[9] One must remember that verbal ability is probably a surrogate variable of teachers effectiveness. Hiring decisions based on the score on an ability test may break the link between verbal ability and achievement because certain teachers may learn how to score highly on a test without necessarily being effective teachers.

[10] The only other author to perform a similar analysis is Katzman [10]. His maximands consist of Reading, and Mathematics scores, Latin pass, Attendance, Latin Application and Continuation. He finds that reading and mathematics are complements which provides justification for considering them as a single output, achievement, in this paper. His other outputs are quite different from those that I consider.

[11] The output maximization problem considers only the five teacher characteristics of interest. If the production function includes only these variables then, for example, the actual maximum level of achievement equals 7.5151. One must remember that the production function actually includes forty-eight exogenous variables. The additional variables will reduce the achievement score. In order to determine the actual maximum achievement level, the expected achievement level of 5.6597 must be subtracted from the level obtained by considering only teachers' characteristics. Once this has been done, one can compare the numbers in Table 12 with the means in order to see how much improvement in each output has been obtained.

Table 1

Variables' Descriptions

Variable Name	Description
ACH	Achievement; an index constructed from the number of correct verbal, general information, reading, nonverbal and mathematical answers ($\alpha \approx 0.91$).
TVR	Teacher's verbal ability; score on an achievement test of thirty questions
TNYTCH	Teacher's experience; number of years teaching
TWHITE	White = 1, otherwise = 0.
TFEMALE	Female = 1, Male = 0.
NTPRPUP	Number of teachers per pupil; the inverse of class size.

Table 2

Means of the Variables for each Racial and Ethnic Group

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexican Americans	Total
ACH	2.0698	2.6787	-0.3015	-1.2619	-1.4888	-0.9628	0.3217
TVR	25.347	25.314	24.868	25.026	23.0360	24.396	24.522
TNYTCH	10.818	8.969	8.279	8.7575	9.3930	9.249	9.238
TWHITE	0.5342	0.9316	0.7770	0.6646	0.4047	0.4824	0.6754
TFEMALE	0.5076	0.4506	0.3958	0.4733	0.4922	0.4263	0.4609
NTPRPUP	0.0389	0.0449	0.0469	0.0455	0.0419	0.0429	0.0433
N	1324	4336	925	1127	3938	2228	14978

Table 3

Achievement Production Function Estimates

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexcian Americans	Total
TVR	0.3979**	0.0459	0.0965	0.3999**	0.1177**	0.1698**	0.1879**
TNYTCH	-0.0590	0.0165	-0.0071	0.0255	0.0373*	0.0241	0.0308**
TWHITE	-0.0998	0.4766*	0.8045*	0.8788**	0.3914*	0.7193**	0.2535*
TFEMALE	4.5441**	-0.5259	-0.5295	-0.5707	0.0772	1.0251	0.1732
NTPRPUP	38.5915	8.0371	19.7826	28.4584	10.1933	15.2497	11.9299**
R^2	0.2474	0.2654	0.3250	0.2537	0.2876	0.3080	0.4058

*Significant at less than the 0.05 level for a one tailed test.
**Significant at less than the 0.005 level for a one tailed test.

Table 4

Teacher Cost Equations

	Levin	Antos and Rosen	Boardman	Cost Function
TVR	23.98	15.00	16.0526	32.1052
TNYTCH	78.91	55.00	76.0528	152.1056
TWHITE	0.0	1007.00	143.961	287.922
TFEMALE	-399.0	-155.00	-397.285	794.57
CONSTANT	5832.47	N/A	5757.34	0
NTPRPUP	0	0	0	266184.0
MEAN SALARY	7085.0	5384.0	6562.0	
R^2	0.65	0.69	0.68	

Table 5

Expected Increase in Achievement for one Thousand Dollars Expended on each Input per Class per Year

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexican Americans	Total
TVR	12.39357	1.43058	3.00590	12.45521	3.66514	5.28983	5.85363
TNYTCH	-0.38785	0.10851	-0.04644	0.16778	0.24505	0.15867	0.20221
TWHITE	-0.34655	1.65554	2.79424	3.05233	1.35925	2.49829	0.88039
TFEMALE	-5.71899	0.66191	0.66636	0.71820	-0.09710	-1.29008	-0.21794
NTPRPUP	0.14498	0.03019	0.07432	0.10691	0.03829	0.05729	0.04482

Table 6

Descriptions of Additional Educational Outputs

Variable Name	Description
MOTACH	Achievement Motivation; an index constructed from how far the pupil wants to go in school, how good the student wants to be in school, how happy to quit school ($\alpha \approx 0.56$).
DEMMOT	Demonstrated Motivation; an index constructed from number of hours study and number of hours stay away because not want to come ($\alpha \approx 0.40$).
SELFEST	Self Esteem; an index constructed from sometimes student feels he cannot learn, teachers go too fast, would change to be someone different, able to do many things well, assessment of own ability ($\alpha \approx 0.65$).
CONTROL	Internal control, fate control or belief in one's ability to control one's environment; an index constructed from good luck is more important than hard work for success, every time get ahead someone or something stops me, whatever education hard to get job ($\alpha \approx 0.59$).
EXP	Expectations; an index constructed from occupational expectations and plans about college ($\alpha \approx 0.56$).

Table 7

The Means of the Educational Outputs by Ethnic and Racial Group

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexcian Americans	Total
ACH	2.0698	2.6787	-0.3015	-1.2619	-1.4888	-0.9628	0.3217
MOTACH	0.2796	0.1961	-0.2038	-0.5716	0.3536	-0.4425	0.0216
DEMMOT	0.4420	0.0144	-0.3278	-0.4103	0.3713	-0.3093	0.0115
SELFEST	-0.2575	0.5606	-0.3316	-0.4556	0.0926	-0.3131	0.0448
CONTROL	0.1657	0.6818	-0.1455	-0.4865	-0.2042	-0.2491	0.0544
EXP	0.5359	0.3616	-0.0858	-0.3736	0.0844	-0.3854	0.0709

Table 8

The Linear Programming Problem: Cost Minimization Subject to Input Boundary and Production Function Constraints for the Total Sample

Inputs							
TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY	
Minimize:							
32.1052	152.1056	287.922	-794.57	266184.0			
Subject to:							
1	0	0	0	0	≥	0	(1)
-1	0	0	0	0	≥	-30	(2)
0	1	0	0	0	≥	0	(3)
0	-1	0	0	0	≥	-35	(4)
0	0	1	0	0	≥	0	(5)
0	0	-1	0	0	≥	-1	(6)
0	0	0	1	0	≥	0	(7)
0	0	0	-1	0	≥	-1	(8)
0	0	0	0	1	≥	0.025	(9)
0	0	0	0	-1	≥	-0.0833	(10)
0.187932	0.0307576	0.2534848	0.173167	11.9299	≥	5.659680794	(11)
-0.0459662	0.00782968	0.3430256	0.0560966	-2.01295	≥	-0.8844029261	(12)
-0.00880634	0.0201062	0.2951536	0.1145554	0.0402568	≥	0.2236713812	(13)
-0.0113431	0.0293486	0.1230088	0.01771924	-0.333847	≥	0.06976918109	(14)
0.0266452	0.01549854	0.2372052	0.0427542	-1.05425	≥	0.9308722331	(15)
-0.0326487	0.01404276	0.1064668	0.209276	-0.5846	≥	-0.5278127079	(16)

Table 9

The Solutions to the Cost Minimization Problem Subject to Input and Production Constraints: Optimal Values of the Input Variables for each Racial and Ethnic Group

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexican Americans	Total
TVR	26.843	24.931	26.499	24.207	21.902	30.000	25.025
TNYTCH	11.746	8.269	11.306	16.218	10.293	0.543	7.539
TWHITE	0.000	1.000	1.000	1.000	1.000	1.000	1.000
TFEMALE	1.000	0.154	0.174	0.000	1.000	0.957	1.000
NTPRPUP	0.025	0.025	0.025	0.030	0.025	0.025	0.025
COST	8508.48	8878.43	9374.79	11632.00	8416.80	7227.63	8098.03
COST*	6480.87	7637.92	7140.62	6799.23	6774.67	6691.57	6746.38

*Excluding all production function constraints except the achievement production function

Table 10

The Slack Variables (x-1) for the Cost Minimization Problem

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexican Americans	Total
ACH	2.2937	0	0	0	0	1.3851	0
MOTACH	0.2865	0.1493	0.1660	0	0.1507	0.2597	0.1419
DEMMOT	0.3639	0	0.4431	0.6731	0	0	0.1182
SELFEST	0	0.0389	0	0	0.4275	0	0
CONTROL	0.1561	0.0165	0.2287	0.1740	0.4742	0.0756	0.1064
EXP	0	0	0	0.1207	0.4239	0.2680	0.1178

Table 11

The Solutions to the Achievement Maximization Problem Subject to Cost and Other Production Input Constraints

	Asian Americans	Whites	Native Americans	Puerto Ricans	Blacks	Mexican Americans	Total
TVR	29.064	21.621	30	26.737	28.673	30	30
TNYTCH	4.097	20.875	9.4805	11.511	35	35	35
TWHITE	0	1	1	1	1	1	1
TFEMALE	1	0	0.338	0	0	1	1
NTPRPUP	0.0502	0.0374	0.0440	0.0422	0.0285	0.0313	0.0313
ACH	17.8042	2.1151	4.3231	13.0643	5.3606	8.1620	7.5151
Expected ACH	13.2031	1.8782	3.6844	11.8385	3.6842	5.8049	5.6597
Δ ACH	4.6011	0.2369	0.6387	1.2258	1.6764	2.3571	1.8554
σ	1.3582	0.0743	0.1960	0.3726	0.5630	0.7350	0.5074
%ΔWHT	755.64	N/A	21.43	31.11	40.23	64.73	N/A

Table 12

Some Vertices of the Production Possibility Frontier: Expenditure at $14124

Output levels

Maximand	Achievement	Achievement Motivation	Demonstrated Motivation	Self Esteem	Sense of Control	Expectations
ACH	2.1771	0.1371	0.6383	0.7922	0.7122	0.4082
MOTACH	0.3217	0.5920	0.7260	0.9047	0.4459	0.7323
DEMMOT	0.3217	0.5920	0.7260	0.9047	0.4459	0.7323
SELFEST	0.3217	0.5920	0.7260	0.9047	0.4459	0.7323
CONTROL	2.1014	0.1499	0.6381	0.7943	0.7184	0.4119
EXP	0.3217	0.5920	0.7260	0.9047	0.4459	0.7323
MEAN	0.3217	0.0216	0.0115	0.0448	0.0544	0.0709

APPENDIX 1

Production Function Constraints for Asian Americans

TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY
0.397898	-0.0589948	-0.0997808	4.54414	38.5915	≥	13.20314138
-0.0807816	0.0445608	0.0977252	1.11583	9.41567	≥	-0.5803251183
0.0803355	0.0338592	0.2803512	0.42028	-11.1294	≥	2.332331415
-0.11437	0.032829	-0.1386824	0.70241	20.0435	≥	-1.480955994
-0.0352777	0.0341358	-0.03910908	0.578072	9.20842	≥	0.1061561012
0.0369469	0.0504816	-0.2479696	-0.134957	12.0662	≥	1.75142512

APPENDIX 2

Production Function Constraints for Whites

TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY
_0.0459289	0.01650564	0.476616	-0.525936	8.03707	≥	1.878166797
-0.0438631	0.01098972	0.414688	0.0418188	-6.25583	≥	-0.8872240442
-0.0238732	0.0203416	0.153774	0.1225186	-1.55832	≥	-0.2933210922
-0.0345176	-0.01130326	0.135284	0.01568022	-0.662876	≥	-0.8717994624
-0.0175411	-0.00472084	0.372058	0.0779014	-0.207185	≥	-0.1139762802
0.0241607	0.01359318	0.1477756	0.252948	-4.21714	≥	0.7960127569

APPENDIX 3

Production Function Constraints for Native Americans

TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY
0.0965049	-0.00706434	0.804524	-0.52947	19.7826	≥	3.684417071
-0.0326468	0.023906	0.60912	-0.0543446	0.0437522	≥	-0.1600997824
0.056119	-0.01474218	0.1700112	0.725394	-23.7254	≥	0.5804364789
-0.0149838	0.0905256	0.2541676	-0.283512	16.87	≥	1.253024174
0.00427401	0.052775	0.3306136	-0.41146	4.70722	≥	0.857933583
-0.0199274	0.0152405	0.5888	1.001488	-3.52904	≥	0.3190743334

APPENDIX 4

Production Function Constraints for Puerto Ricans

TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY
0.399877	0.0255204	0.878832	-0.570662	28.4584	≥	11.83851299
-0.0546259	-0.0226698	-0.02652384	-0.366694	2.67998	≥	-1.63495067
-0.0757272	0.0525192	0.3959432	0.1287542	-9.80991	≥	-1.557087308
-0.0765753	0.040911	0.57766	0.1424428	32.8854	≥	0.3882059219
0.0496745	0.0324364	0.339584	-0.095628	12.4044	≥	2.271546628
-0.0492765	0.022756	-0.1146608	-0.253926	11.388	≥	-0.7125962825

APPENDIX 5

Production Function Constraints for Blacks

TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY
0.11767	0.0372734	0.3913572	0.07715	10.1933	≥	3.684176306
-0.035747	0.00256744	0.1754904	-0.0320108	-1.16002	≥	¯0.7926975309
-0.00771275	0.0362404	0.1624452	0.0375388	9.2995	≥	0.6365830893
-0.0314429	0.0512062	0.2749232	0.313296	-1.35603	≥	¯0.03471830949
0.00800236	0.0449236	0.3073404	0.31718	-5.84696	≥	0.6417933926
-0.0512129	0.0241726	0.2675352	0.297466	-1.99422	≥	¯0.7815869458

APPENDIX 6

Production Function Constraints for Mexican Americans

TVR	TNYTCH	TWHITE	TFEMALE	NTPRPUP		BOUNDARY
0.169831	0.0241352	0.719312	1.02506	15.2497	≥	5.804911615
-0.0333112	0.0168188	0.55904	0.593814	0.666412	≥	-0.1057177478
-0.0465502	0.0419156	0.456432	1.151306	12.3853	≥	0.4945808909
0.016776	0.01345412	0.2628016	-0.354072	-4.19233	≥	0.3295986108
-0.0137749	0.01023212	0.420084	0.1687862	3.63984	≥	0.1894040469
-0.0174692	-0.00732568	0.0876972	0.488516	0.153973	≥	-0.2367917986

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APPENDIX I

BRIEF DESCRIPTIONS OF THE VARIABLES USED IN THE ANALYSES OF THE EEOS DATA

VARIABLE NAME	DESCRIPTION[1]
Endogenous Variables:	
ACH	Achievement; an index[2] constructed from verbal right (VR), nonverbal right (NVR), reading right (RR), mathematical right (MR), and general informational right (GITR).
CPREP	College preparatory program; in a college preparation program = 1, otherwise = 0.
ACHMOT	Achievement Motivation; an index constructed from how far the pupil wants to go in school (FARSCL); how good the student wants to be in school (DESIN SCL) and how happy to quit school (HPYTQTSCL).
EFFORT	Effort, an index constructed from number of hours study (NHRSTUDY) and how often the pupil stays away because he does not want to come (NDSTAYFS).
EXP	Expectations; an index constructed from desire to go to college (COLLEGE), and career expectations (JOBEXP).
SELFEST	Self esteem; an index constructed from sometimes the student feels he cannot learn (ELEARN), teachers go too fast (EFSTTGH), would change to be someone different (ECHANGE), able to do many things well (EABLE), assessment of own ability (OA).
CONTROL	Internal control or belief in one's ability to control one's environment; an index constructed from good luck is more important than hard work for success (EHWORK), everytime get ahead something stops me (EAHEAD), whatever education hard to get job (EHJOB).

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[1] Unless otherwise noted, variable is scored same way in 9th and 12th grade samples.

[2] All indices come from the first component of a principal components analysis. The indices correlate positively with each other. All variables in an index have zero mean and unit standard deviation.

Endogenous Variables (continued)

PPAEXP	Perceived Parents' Expectations: an index constructed from mother's and father's desires about position in school class (MOXEXP AND FASEXP), and father's and mother's desires about completing school and going to college (FAJEXP and MOJEXP, respectively).
PTEXP	Perceived Teachers' Expectations; teachers expect student to be one of best in class = 2,..., good enough to get by = -8.[3]

Additional Endogenous variables (used in early analyses)

MOT	Motivation; an index constructed from how far the pupil wants to go in school (FARSCL), how happy to quit school (HYPTQTSCL), how good the student wants to be in school (DESINSCL), number of hours of study (NHRSTUDY), and the number of days stay from school (NDSTAYFS).
EFF	Efficacy; an index constructed from good luck is more important than hard work for success (EHWORK) get ahead somebody stops me (EAHEAD), whatever education hard to get job (EHJOB), would change to be somebody different (ECHANGE), sometimes can't learn (ELEARN), teachers go too fast (EFSTTCH), not much chance for success (ECNCESUC), able to do many things (EABLE).

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[3] In the original data and in the cross products matrices, this variable is coded backwards: one of best = 2,..., good enough to get by = 8. In all tables, the variable is presented as if it was coded as described above. Thus, all endogenous variables appear to correlate positively, and the tables are easier to read.

VARIABLE NAME	DESCRIPTION
Exogenous Variables:	
SEX	Sex; male = 2, female = 4.
AGE	Age; less than 14 = 1,...,20 or older = 7.
SES	Socio Economic Background; an index constructed from father's occupational level (FAOCC), father's and mother's educational level (FAEDD and MOEDD, respectively). Encyclopedia in home (ENCYIH), attended kindergarten and nursery school (KNGTEN and NURSERY, respectively), number of hours work for pay (NHWFPAY), and number of people per room in the house (DENSITY).
INFO	Available Information in the Home; an index constructed from dictionary in home (DICTIH), daily newspaper in home (DNEWSIH), trips to library (LIB), number of magazines and books in home (NMIH and NBIH, respectively).
TWOP	Two Parents; two parents alive and living at home = 1, otherwise = 0.
NOBAS (12th Grade) NNOBAS (9th Grade)	Number of Older Brothers and Sisters; none older = 1,...,8 or more older = 9. (12th grade) 1 = 0, 2= 1,...,5 = 4 or more. (9 th grade)
FL	Foreign Language; frequently speak a foreign language out of school = 1,...,never speak a foreign language = 4.
RBS (12th Grade)	Reading Before School; not read to before going to school = 1,...,regularly read to before going to school = 4. (12th grade)
NRBS (9th Grade)	Not read to before going to school = 1,...,read to many times = 3.
PTAAT	Parents Attend PTA; parents not go to PTA = 1,..., parents go most of the time = 4.
PTAS	Parents Talk About School; parents talk about school once a day = 1,...,parents never or hardly ever talk about school = 4.
TC	This City; spent most of life in this city or town = 1, otherwise = 0.
NTCHSCL	Number of Times Changed School; never changed school = 1,...,changed school four or more times = 5.

VARIABLE NAME	DESCRIPTION
Exogenous Variables: (Continued)	
LSTCHSCL	Last Time Changed School; changed school within a year = 2,...,changed school five or more years ago = 7.
AVES	Average Socio-Economic Background.
PWPICLY	Proportion of White Students in Class Last Year; no whites = 1,...,all white = 5.
MLYBLCK (12th Grade)	Mainly Black School; less than 30% white = 1, otherwise = 0. (12th grade only)
MIX (12th Grade)	Integrated School; 30% - 69% white = 1, otherwise = 0. (12th grade only)
PWHITE (9th Grade)	Percentage White in School; 0% = 1,...,100% = 12. (9th grade only)
PWHITE2	PWHITE x x 2
TAVR	Teachers' Average Verbal Right; teachers' average verbal right for all teachers in the school.
NTPRPUP	Number of Teachers Per Pupil.
TANYTCH	Teachers' Average Number of Years Teaching; no years teaching = 1,...,30 or more years = 8.
TANYTCH2	TANYTCH x x 2
PWTCHLY	Proportion of White Teachers Last Year; no white teachers = 1,...,all white teachers = 5.
TASEX	Teachers' Sex; all males = 2,...,all females = 4.
TPTC	Proportion of Teachers from This City; all from this city = 1,...,none from this city = 0.
TPADTN (12th Grade)	Teachers' Problems with Administration; lack of effective leadership = 1,...,no problem = 0. (12th grade)
TAPB9 (9th Grade)	Teachers' Problems with Administration; Index ranging from no problems = 0,..., many problems = 7. (9th grade only)
FACILITS (12th Grade)	School Facilities; a combination of principal's responses about library, auditorium, gymnasium, laboratories, etc. (12th grade only)
NFACILITS (9th Grade)	Same as FACILITS but excludes questions about auditorium, cafeteria and gym. (9th grade only)

Exogenous Variables: (Continued)

VARIABLE NAME	DESCRIPTION
PROBLEMS	Problems in the school; a combination of principal's responses about problems of damage, discourtesy and violence to teachers, racial tension, stealing, drugs and drink (high value means many problems).
AGES	Age of school; main classroom less than one year old = 1,...,more than 39 years old = 7.
TEST	Test; school gives intelligence tests and standardized achievement tests = 2, school gives intelligence or standard achievement tests = 1, otherwise = 0.
NTCHLV	Number of Teachers who Leave; less than 5% left = 1, ...,more than 50% left = 7.
PRNMADEG (12th Grade)	Principal has M.A. Degree; no degree = 1,..., Doctorate = 6. (12th grade)
NPRNMADC (9th Grade)	No degree = 5,...,Doctorate = 30. (9th grade)
SMSA	Standard Metropolitan Statistical Area; within metropolitan area = 1, otherwise = 2. (12th grade) within metropolitan area = 1, other = 0. (9th grade)
NEWENG	New England; New England States = 1, otherwise = 0.
MIDATL	Mid Atlantic; Mid Atlantic States = 1, otherwise = 0.
LAKES	Great Lakes; Great Lakes States = 1, otherwise = 0.
PLAINS	Plains; Plains States = 1, otherwise = 0.
SEAST	Southeast; South Eastern States = 1, otherwise = 0.
SWEST	Southwest; South Western States = 1, otherwise = 0.
NTLKGC (12th Grade)	Number of Times Talk to Guidance Counselor; not once = 1,...,six or more times = 5. (12th grade)
SEEGC (9th Grade)	See Guidance Counselor; whenever wants to = 1,..., otherwise = 0. (9th grade)
NHWTV	Number of Hours Watch T.V.; not watch T.V. = 1,..., 4 or more hours a day = 7.
NHWTV2	NHWTV x x 2
CONST	Constant

Coefficients of Determination:

ABBREVIATION	DESCRIPTION
MLR^2	This is the R^2 based on the TSLS, estimated structural form coefficients and the actual values of the endogenous variables.
$ALTR^2$	This is the R^2 based on the TSLS, estimated structural form coefficients and the predicted values of the endogenous variables.

APPENDIX II

BRIEF DESCRIPTIONS OF VARIABLES USED IN THE ANALYSIS OF THE NLS DATA

VARIABLE NAME	DESCRIPTION
Endogenous Variables:	
ACH	Achievement; an index constructed from the number of correct answers on vocabulary (VOCAB), picture number (PICNUM), reading (READING), letter group (LETGRP), mathematics (MATH) and mosaic (MOSACI) achievement tests.
CPREP	College preparatory program; in a college preparatory program = 1, otherwise = 0.
ACHMOT	Achievement motivation; an index constructed from the type of work student like to do (laborer =1,..., manager or professional=10), and number of year of education would like to attain.
EFFORT	Effort; number of hours spent on homework per week.
EXP	Expectations; number of years of education student plans to attain.
SELFEST	Self esteem; an index constructed from I take a positive attitude toward myself, I feel I am a person of worth on an equal plane with others, I am able to do things as well as most other people, on the whole I'm satisfied with myself.
CONTROL	Internal control or belief in one's ability to control one's environment; an index constructed from good luck is more important than hark work for success, every time I get ahead something or somebody stops me, planning only makes a person unhappy since plans hardly ever work anyway, people who accept their condition in life are happier than those who try to change things.
PAEXP	Perceived parents' expectations; an index constructed from number of years of schooling father and mother want student to get.
PTEXP	Perceived teachers' expectations; teachers have tried to influence students plans for college (encourage = 3,..., discourage = 1)

VARIABLE NAME	DESCRIPTION
Exogenous variables:	
SEX	Sex; male=0, female = 1.
AGE	Age; in years.
SES	Socioeconomic status; an index constructed from father's and mother's occupational level (laborer = 1,..., manager or professional = 10) and father's and mother's educational level, in years).
PAINC	Parents' income ($).
INFO	Available information in the home; an index constructed from daily newspaper, dictionary encyclopedia or other reference books, and magazines in home.
PARDIS	Number of times discuss future plans with parents (never=1,...,often=3).
TRANSFER	Transfer; a transfer = 1, otherwise = 0.
DURRES	Duration of residence; number of years lived at present residence.
COUNS	See guidance counselor; usually whenever want to or need to = 1, otherwise = 0.
PROTSTNT	Protestant = 1, otherwise = 0.
CATHOLIC	Roman Catholic = 1, otherwise = 0.
OTHCHRS	Other christain = 1, otherwise = 0.
JEWISH	Jewish = 1, otherwise = 0.
OTHREL	Other religion = 1, otherwise = 0.
NOREL	No religion = 1, otherwise = 0.

APPENDIX III

MEANS AND STANDARD DEVIATIONS (IN PARENTHESIS) OF EXOGENOUS VARIABLES INCLUDED IN ACHIEVEMENT EQUATION
(9th Grade EEOS Sample)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
SEX	3.050	2.995	2.929	2.949	3.026	2.872	3.018	2.987
	(0.995)	(0.998)	(0.992)	(0.993)	(0.991)	(0.986)	(0.991)	(0.995)
AGE	3.063	3.001	3.411	2.912	3.347	3.288	3.288	3.139
	(0.924)	(0.741)	(1.080)	(1.004)	(1.062)	(1.027)	(1.164)	(0.947)
SES	-0.248	1.393	-0.358	0.536	-1.104	-0.513	-0.246	0.145
	(2.156)	(2.225)	(2.489)	(2.143)	(2.122)	(2.179)	(2.338)	(2.382)
INFO	0.069	0.647	-0.300	0.499	-0.399	-0.393	-0.025	0.108
	(1.571)	(1.379)	(1.860)	(1.419)	(1.796)	(1.830)	(1.882)	(1.672)
TWOP	0.507	0.792	0.544	0.771	0.506	0.629	0.574	0.633
	(0.500)	(0.406)	(0.498)	(0.421)	(0.500)	(0.483)	(0.495)	(0.482)
NNOBAS	2.822	2.285	3.045	2.583	2.897	2.903	2.929	2.686
	(1.513)	(1.279)	(1.559)	(1.381)	(1.552)	(1.540)	(1.588)	(1.481)
FL	3.644	3.640	3.118	2.699	2.363	2.938	2.843	3.265
	(0.786)	(0.740)	(1.117)	(1.127)	(1.190)	(1.197)	(1.204)	(1.071)
NRBS	2.180	2.363	1.981	1.887	1.782	2.026	1.884	2.126
	(0.915)	(0.838)	(0.911)	(0.888)	(0.888)	(0.897)	(0.910)	(0.906)
PTAAT	2.147	1.906	1.797	1.908	1.761	1.832	1.811	1.928
	(1.152)	(1.113)	(1.083)	(1.151)	(1.079)	(1.083)	(1.126)	(1.123)
PTAS	1.662	1.678	2.095	1.957	1.978	1.975	2.071	1.814
	(0.952)	(0.989)	(1.159)	(1.113)	(1.118)	(1.128)	(1.193)	(1.059)
TC	0.807	0.748	0.610	0.721	0.714	0.725	0.609	0.740
	(0.394)	(0.434)	(0.488)	(0.449)	(0.452)	(0.447)	(0.488)	(0.439)
NTSCHSCL	2.537	2.482	2.846	2.241	2.916	2.659	2.778	2.600
	(1.468)	(1.546)	(1.560)	(1.435)	(1.519)	(1.561)	(1.589)	(1.533)
LSTCHSCL	5.561	5.754	5.314	5.881	5.215	5.487	5.300	5.556
	(1.883)	(1.767)	(1.949)	(1.711)	(1.950)	(1.923)	(1.948)	(1.872)
AVSES	-0.083	1.191	0.263	0.534	-0.284	0.301	0.517	0.429
	(1.115)	(1.015)	(1.208)	(0.948)	(0.991)	(1.132)	(1.078)	(1.207)
PWPICLY	1.874	4.434	3.082	3.017	2.971	3.365	3.161	3.228
	(1.160)	(0.881)	(1.409)	(1.302)	(1.204)	(1.467)	(1.364)	(1.526)

APPENDIX III(Continued)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
PWHITE	3.524 (3.261)	10.250 (2.124)	7.135 (3.710)	5.229 (3.327)	4.595 (3.169)	7.858 (3.843)	6.628 (3.734)	6.898 (4.124)
PWHITE2	23.053 (35.537)	109.570 (33.523)	64.657 (49.323)	38.404 (42.603)	31.159 (38.232)	76.511 (49.895)	57.855 (49.077)	64.588 (53.383)
TAVR	22.939 (2.795)	25.125 (1.057)	24.624 (1.877)	25.434 (1.301)	25.039 (1.873)	24.251 (2.394)	24.956 (1.599)	24.384 (2.224)
NTPRPUP	0.043 (0.008)	0.045 (0.008)	0.047 (0.008)	0.044 (0.009)	0.050 (0.009)	0.043 (0.007)	0.045 (0.008)	0.045 (0.008)
TANYTCH	4.065 (0.711)	3.880 (0.732)	3.810 (0.673)	4.002 (0.768)	3.629 (0.626)	4.106 (0.739)	3.814 (0.839)	3.935 (0.736)
PWTCHLY	2.355 (1.491)	4.724 (0.780)	3.890 (1.414)	3.461 (1.555)	3.632 (1.380)	3.835 (1.540)	3.636 (1.488)	3.686 (1.582)
TASEX	1.510 (0.129)	1.474 (0.143)	1.407 (0.146)	1.514 (0.155)	1.466 (0.114)	1.455 (0.134)	1.457 (0.159)	1.476 (0.139)
TPTC	0.478 (0.231)	0.365 (0.238)	0.315 (0.269)	0.507 (0.249)	0.713 (0.257)	0.354 (0.218)	0.411 (0.278)	0.438 (0.266)
TAPB9	1.683 (0.705)	1.019 (0.622)	1.387 (0.751)	1.163 (0.628)	1.810 (0.647)	1.323 (0.712)	1.479 (1.005)	1.380 (0.752)
NFACILIT	31.352 (7.923)	33.318 (8.602)	33.212 (8.093)	30.564 (7.329)	30.196 (7.022)	34.417 (8.340)	32.020 (8.086)	32.454 (8.227)
PROBLEMS	11.739 (2.798)	10.088 (2.013)	11.321 (2.517)	10.634 (1.965)	12.369 (2.235)	11.014 (2.398)	10.987 (2.153)	11.069 (2.488)
AGES	4.785 (1.776)	4.346 (1.783)	4.275 (1.702)	5.023 (1.838)	5.041 (1.874)	4.479 (1.678)	4.475 (1.806)	4.593 (1.792)
TEST	1.801 (0.438)	1.871 (0.341)	1.801 (0.412)	1.740 (0.439)	1.281 (0.457)	1.846 (0.379)	1.756 (0.435)	1.766 (0.439)
NTCHLV	2.089 (1.348)	2.599 (1.570)	2.632 (1.717)	2.449 (1.339)	2.185 (1.537)	2.356 (1.526)	2.659 (1.685)	2.378 (1.526)
NPRNMADG	23.474 (2.974)	23.401 (2.952)	22.977 (2.678)	23.203 (2.551)	23.734 (2.740)	23.134 (2.797)	23.280 (2.856)	23.373 (2.877)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
SMSA	0.766	0.707	0.512	0.797	0.903	0.622	0.708	0.723
	(0.423)	(0.455)	(0.500)	(0.402)	(0.296)	(0.485)	(0.455)	(0.448)
NEWENG	0.010	0.072	0.023	0.015	0.008	0.014	0.034	0.032
	(0.097)	(0.259)	(0.149)	(0.120)	(0.089)	(0.117)	(0.181)	(0.175)
MIDATL	0.309	0.222	0.235	0.296	0.752	0.122	0.275	0.295
	(0.462)	(0.415)	(0.424)	(0.457)	(0.432)	(0.327)	(0.447)	(0.456)
LAKES	0.185	0.222	0.121	0.034	0.070	0.138	0.092	0.160
	(0.389)	(0.416)	(0.326)	(0.182)	(0.255)	(0.345)	(0.289)	(0.367)
PLAINS	0.045	0.066	0.026	0.011	0.007	0.025	0.019	0.040
	(0.207)	(0.248)	(0.160)	(0.103)	(0.083)	(0.156)	(0.136)	(0.195)
SEAST	0.308	0.187	0.125	0.033	0.086	0.229	0.073	0.198
	(0.462)	(0.390)	(0.331)	(0.179)	(0.281)	(0.420)	(0.260)	(0.398)
SWEST	0.058	0.054	0.248	0.027	0.023	0.166	0.079	0.082
	(0.235)	(0.226)	(0.432)	(0.163)	(0.149)	(0.372)	(0.270)	(0.274)
SEEGC	0.634	0.782	0.549	0.715	0.619	0.569	0.571	0.663
	(0.482)	(0.413)	(0.498)	(0.452)	(0.486)	(0.495)	(0.495)	(0.473)
NHWTV	5.001	4.754	4.428	4.422	4.840	4.577	4.538	4.753
	(2.189)	(1.871)	(2.266)	(2.038)	(2.184)	(2.143)	(2.186)	(2.093)
NHWTV2	29.801	26.101	24.733	23.706	28.195	25.536	25.366	26.968
	(18.572)	(16.081)	(18.707)	(16.800)	(18.514)	(17.996)	(18.409)	(17.754)
BLACK	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.255
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.436)
WHITE	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.309
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.462)
AMIND	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.061
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.239)
ORIENT	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.045
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.208)
PRICAN	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.115
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.319)

APPENDIX III (Continued)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
MEXAM	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	1.000 (0.000)	0.000 (0.000)	0.170 (0.375)

APPENDIX IV

MEANS AND STANDARD DEVIATIONS (IN PARENTHESIS) OF EXOGENOUS VARIABLES INCLUDED IN ACHIEVEMENT EQUATION
(12th Grade EEOS Sample)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
SEX	3.121 (0.991)	2.995 (0.999)	2.919 (0.956)	2.910 (0.996)	3.025 (0.996)	2.929 (0.995)	3.017 (0.995)	3.010 (0.998)
AGE	4.012 (0.841)	3.939 (0.665)	4.343 (1.035)	3.770 (0.795)	4.285 (1.140)	4.277 (1.046)	4.116 (1.176)	4.067 (0.916)
SES	-0.359 (2.092)	1.241 (2.130)	-0.573 (2.358)	0.661 (1.969)	-0.945 (2.273)	-0.703 (2.109)	0.114 (2.456)	0.080 (2.307)
INFO	-0.049 (1.628)	0.656 (1.437)	-0.582 (1.941)	0.621 (1.474)	-0.501 (1.981)	-0.525 (1.871)	-0.020 (2.030)	0.051 (1.763)
TWOP	0.525 (0.499)	0.803 (0.398)	0.552 (0.498)	0.776 (0.417)	0.536 (0.499)	0.626 (0.484)	0.557 (0.497)	0.642 (0.479)
NOBAS	3.050 (2.227)	2.187 (1.556)	3.323 (2.293)	2.683 (1.900)	3.260 (2.446)	3.343 (2.424)	3.215 (2.410)	2.877 (2.159)
FL	3.619 (0.764)	3.616 (0.736)	3.180 (1.080)	2.872 (1.094)	2.138 (1.171)	2.694 (1.213)	2.956 (1.129)	3.219 (1.071)
RBS	2.579 (1.227)	2.646 (1.137)	2.098 (1.141)	2.108 (1.115)	2.008 (1.174)	2.225 (1.172)	2.195 (1.213)	2.395 (1.199)
PTAAT	1.970 (1.103)	1.625 (0.992)	1.566 (0.968)	1.653 (0.989)	1.573 (0.953)	1.605 (0.964)	1.547 (0.963)	1.702 (1.024)
PTAS	1.805 (0.989)	1.853 (1.068)	2.327 (1.192)	2.204 (1.120)	2.219 (1.185)	2.133 (1.155)	2.296 (1.238)	2.009 (1.117)
TC	0.821 (0.384)	0.779 (0.415)	0.627 (0.484)	0.796 (0.403)	0.681 (0.466)	0.745 (0.436)	0.618 (0.486)	0.755 (0.430)
NTCHSCL	2.430 (1.439)	2.471 (1.533)	2.899 (1.546)	2.187 (1.394)	2.896 (1.542)	2.691 (1.537)	3.048 (1.600)	2.586 (1.524)
LTCHSCL	6.158 (1.531)	6.197 (1.495)	5.639 (1.801)	6.185 (1.535)	5.570 (1.890)	5.893 (1.735)	5.613 (1.888)	6.004 (1.651)
AVSES	-0.280 (1.080)	0.680 (0.943)	-0.515 (1.213)	0.466 (0.607)	-0.308 (0.977)	-0.211 (1.054)	0.406 (0.908)	0.080 (1.099)
PWPICLY	2.020 (1.273)	4.280 (0.882)	2.994 (1.388)	2.926 (1.191)	2.985 (1.227)	3.310 (1.457)	3.067 (1.373)	3.135 (1.477)

APPENDIX IV (Continued)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
MLYBLCK	0.657	0.034	0.424	0.634	0.411	0.248	0.395	0.366
	(0.475)	(0.180)	(0.494)	(0.482)	(0.492)	(0.432)	(0.489)	(0.482)
MIX	0.125	0.054	0.080	0.123	0.240	0.061	0.120	0.101
	(0.331)	(0.226)	(0.272)	(0.329)	(0.427	(0.240)	(0.325)	(0.302)
TAVR	22.836	25.260	24.551	25.338	25.039	24.193	25.134	24.382
	(2.952)	(1.067)	(1.594)	(0.910)	(1.971)	(2.477)	(1.477)	(2.295)
NTPRPUP	0.042	0.045	0.047	0.039	0.049	0.043	0.043	0.044
	(0.007)	(0.008)	(0.009)	(0.005)	(0.011)	(0.008)	(0.153)	(0.008)
TANYTCH	4.467	4.386	4.216	4.761	4.351	4.428	4.428	4.430
	(0.641)	(0.662)	(0.768)	(0.883)	(0.583)	(0.637)	(0.744)	(0.693)
TANYTCH2	20.367	19.679	18.364	23.446	19.272	20.010	20.161	20.108
	(5.709)	(5.873)	(6.400)	(8.509)	(5.095)	(5.524)	(6.830)	(6.196)
PWTCHLY	2.523	4.726	3.999	3.140	3.650	3.832	3.441	3.647
	(1.670)	(0.765)	(1.352)	(1.466)	(1.493)	(1.604)	(1.562)	(1.626)
TASEX	2.992	2.897	2.790	3.015	2.980	2.855	2.897	2.924
	(0.249)	(0.276)	(0.276)	(0.342)	(0.282)	(0.253)	(0.305)	(0.283)
TPTC	0.464	0.388	0.255	0.495	0.667	0.345	0.436	0.426
	(0.236)	(0.225)	(0.266)	(0.215)	(0.286)	(0.213)	(0.251)	(0.255)
TPADTN	0.130	0.096	0.072	0.155	0.135	0.106	0.113	0.114
	(0.151)	(0.143)	(0.118)	(0.118)	(0.159)	(0.160)	(0.129)	(0.146)
FACILITS	11.975	12.677	12.493	12.614	11.848	12.418	12.402	12.346
	(2.173)	(1.388)	(1.752)	(1.488)	(1.715)	(1.870)	(1.597)	(1.799)
PROBLEMS	168.39	167.16	167.72	167.25	168.10	167.80	167.70	167.75
	(2.610)	(2.198)	(2.469)	(1.597)	(2.526)	(2.321)	(2.134)	(2.387)
AGES	4.843	4.575	4.079	5.615	5.502	4.518	4.871	4.778
	(1.654)	(1.761)	(1.834)	(1.690)	(1.677)	(1.667)	(1.727)	(1.757)
TEST	1.637	2.409	2.478	1.984	1.641	2.290	2.341	2.152
	(0.533)	(0.441)	(0.465)	(0.321)	(0.521)	(0.432)	(0.427)	(0.485)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
NTCHLV	1.869 (1.177)	2.409 (1.465)	2.478 (1.612)	1.984 (1.424)	1.641 (1.061)	2.290 (1.373)	2.341 (1.575)	2.152 (1.396)
PRNMADEG	4.303 (0.657)	4.215 (0.597)	4.129 (0.523)	3.987 (0.671)	4.302 (0.683)	4.191 (0.625)	4.161 (0.736)	4.213 (0.615)
SMSA	1.321 (0.467)	1.333 (0.471)	1.615 (0.487)	1.181 (0.385)	1.145 (0.352)	1.429 (0.495)	1.235 (0.424)	1.332 (0.471)
NEWENG	0.014 (0.118)	0.061 (0.239)	0.024 (0.153)	0.008 (0.086)	0.019 (0.137)	0.012 (0.107)	0.024 (0.153)	0.028 (0.165)
MIDATL	0.231 (0.422)	0.197 (0.398)	0.141 (0.348)	0.095 (0.294)	0.625 (0.484)	0.082 (0.274)	0.243 (0.429)	0.215 (0.411)
LAKES	0.190 (0.392)	0.214 (0.410)	0.078 (0.268)	0.031 (0.173)	0.083 (0.276)	0.124 (0.329)	0.084 (0.278)	0.149 (0.356)
PLAINS	0.026 (0.160)	0.078 (0.267)	0.095 (0.294)	0.014 (0.116)	0.019 (0.137)	0.030 (0.171)	0.020 (0.142)	0.045 (0.206)
SEAST	0.393 (0.489)	0.196 (0.397)	0.106 (0.308)	0.016 (0.125)	0.118 (0.323)	0.223 (0.416)	0.072 (0.259)	0.215 (0.411)
SWEST	0.065 (0.247)	0.075 (0.264)	0.284 (0.451)	0.015 (0.122)	0.030 (0.172)	0.191 (0.393)	0.057 (0.232)	0.097 (0.295)
NTLKGC	0.080 (0.271)	0.180 (0.384)	0.272 (0.445)	0.822 (0.383)	0.105 (0.307)	0.340 (0.474)	0.500 (0.500)	0.252 (0.434)
NHWTV	4.279 (2.181)	3.780 (1.962)	3.548 (2.168)	3.827 (2.011)	4.144 (2.196)	3.893 (2.138)	4.150 (2.213)	3.969 (2.119)
NHWTV2	23.068 (17.628)	18.138 (15.299)	17.285 (16.772)	18.691 (15.984)	21.995 (17.824)	19.725 (16.933)	22.116 (18.097)	20.244 (16.901)
BLACK	1.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.265 (0.441)
WHITE	0.000 (0.000)	1.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.275 (0.447)
AMIND	0.000 (0.000)	0.000 (0.000)	1.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.081 (0.273)

APPENDIX IV (Continued)

Variable Name	Black	White	Native American	Asian American	Puerto Rican	Mexican American	Other	Total
ORIENT	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	1.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.081 (0.273)
PRICAN	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	1.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.082 (0.275)
MEXAM	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	1.000 (0.000)	0.000 (0.000)	0.147 (0.354)

APPENDIX V

The Estimated Reduced Form and Structural Form Coefficients for Each Ethnic Group: 12th Grade EECS Data

Table 7b: Structural Form Coefficients for the Endogenous Variables: Whites

Explanatory Variable	Dependent Variable						
	ACH	ACHMOT	DEMMOT	CPREP	EXP	SELFEST	CONTROL
ACH				0.028	0.084	0.079	0.041
				(2.500)	(2.419)	(2.115)	(1.262)
ACHMOT							
DEMMOT							0.067
							(1.289)
CPREP	1.670		-0.502		0.437		
	(4.739)		(-1.876)		(1.980)		
EXP		0.182		0.144			0.107
		(2.398)		(7.131)			(1.491)
SELFEST					0.114		0.224
					(1.290)		(2.128)
CONTROL	1.167					0.758	
	(5.792)					(4.333)	
PPAEXP		0.447	0.423		0.309		
		(7.095)	(5.994)		(6.906)		
PTEXP		0.250				0.546	
		(2.214)				(5.890)	

AV.1

Table 8b: Estimated Coefficients of the Demographic and Home Background Variables: Whites

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	Dependent Variable						
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SEX	-0.362	-0.406	-0.116	0.149	0.273	0.454	-0.045
	(-8.461)	(-7.777)	(-5.610)	(5.752)	(13.500)	(14.060)	(-5.911)
AGE	-0.613	-0.258	-0.202	0.051	-0.033	0.100	-0.065
	(-9.208)	(-3.579)	(-6.312)	(1.786)	(-1.046)	(2.585)	(-6.367)
SES	0.277	0.106	0.124	-0.030	0.006	-0.062	0.058
	(10.972)	(3.604)	(10.224)	(-2.186)	(0.492)	(-3.594)	(14.874)
INFO	0.394	0.204	0.207		0.096		0.045
	(10.840)	(5.106)	(11.830)		(5.593)		(8.037)
TWOP	0.015		-0.053	-0.115	0.100		-0.003
	(0.137)		(-1.000)	(-2.575)	(1.918)		(-0.153)
NOBAS	-0.176	-0.126	-0.026		0.006		-0.012
	(-6.053)	(-4.713)	(-1.868)		(0.432)		(-2.706)
FL	0.003	0.076	-0.146	0.028	-0.044		-0.060
	(0.058)	(1.284)	(-5.270)	(1.123)	(-1.614)		(-6.780)
RBS	0.192		0.070		0.013		0.016
	(4.867)		(3.653)		(0.672)		(2.666)
PTAAT	-0.099		0.022		0.080	0.073	0.010
	(-2.221)		(1.007)		(3.801)	(3.110)	(1.421)
PTAS	0.052		-0.163		-0.219	-0.095	-0.025
	(1.231)		(-7.985)		(-10.940)	(-3.225)	(-3.903)
TC	-0.344	-0.182	-0.076		-0.046		0.001
	(-2.875)	(-1.887)	(-1.326)		(-0.806)		(0.066)

AV.2

Table 8b: (cont.)

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
NTCHSCL	-0.064		-0.003		-0.040	-0.067	-0.009
	(-1.837)		(-0.179)		(-2.427)	(-4.291)	(-1.741)
LSTCHSCL	0.069		0.058	0.024	0.035		0.006
	(2.066)		(3.633)	(2.087)	(2.211)		(1.152)

AV 3

Table 8b: (cont.)

Explanatory Variable	Dependent Variable College Prep. Pgm. S.F.	Expectations R.F.	Expectations S.F.	Self Esteem R.F.	Self Esteem S.F.	Control R.F.	Control S.F.
SEX		-0.214		-0.169	-0.194	0.102	0.154
		(-9.382)		(-6.195)	(-4.924)	(5.761)	(5.477)
AGE	-0.015	-0.222		-0.180	0.115	-0.207	-0.117
	(-1.618)	(-6.240)		(-4.241)	(2.689)	(-7.514)	(-4.652)
SES	0.023	0.192	0.067	0.093		0.055	
	(5.098)	(14.238)	(4.806)	(5.779)		(5.266)	
INFO		0.023	0.072	0.184		0.088	
		(12.088)	(3.601)	(7.939)		(5.833)	
TWOP		-0.061	-0.105	0.011		-0.065	-0.068
		(-1.035)	(-2.098)	(0.158)		(-1.429)	(-1.628)
NOBAS		-0.038		-0.009	0.030	-0.017	
		(-2.480)		(-0.497)	(1.726)	(-1.400)	
FL	-0.036	-0.017	-0.067	-0.070		0.038	0.073
	(-4.272)	(-5.628)	(-2.326)	(-1.900)		(1.579)	(3.177)
RBS		0.073		0.182	0.039	0.106	0.049
		(3.477)		(7.223)	(1.476)	(6.514)	(2.312)
PTAAT		0.080	0.078	-0.008		-0.019	-0.028
		(3.373)	(3.837)	(-0.291)		(-1.052)	(-1.543)
PTAS	-0.011	-0.110		-0.051		-0.045	
	(-1.745)	(-4.876)		(-1.879)		(-2.591)	
TC	0.032	-0.199	-0.158	-0.027	0.087	-0.099	-0.044
	(2.372)	(-3.120)	(-2.896)	(-0.356)	(1.470)	(-2.007)	(-1.011)
NTCHSCL		-0.058	-0.052	-0.046		-0.041	-0.024
		(-3.116)	(-3.111)	(-2.105)		(-2.900)	(-1.992)
LSTCHSCL		0.048	0.024	0.017		0.025	
		(2.711)	(1.594)	(0.781)		(1.789)	

AV.4

Table 9b: Estimated Coefficients of the School's Student Composition Variables: Whites

Explanatory Variable	Dependent Variable Achievement R.F.	 S.F.	 Achievement Motivation R.F.	 S.F.	 Demonstrated Motivation R.F.	 S.F.	 College Prep.Pgm. R.F.
AVES	-0.045	0.151	-0.133		0.011	0.052	-0.090
	(-0.641)	(2.954)	(-3.960)		(0.330)	(1.799)	(-8.432)
PWPICLY	0.954	0.789	0.279	0.361	0.330	0.429	0.039
	(3.054)	(2.882)	(1.850)	(3.000)	(2.233)	(2.735)	(0.821)
PWPICLY2	-0.112	-0.096	-0.025	-0.043	-0.038	-0.054	-0.001
	(-2.603)	(-2.545)	(-1.203)	(-2.626)	(-1.844)	(-2.489)	(-0.214)
PWHITE	-0.162		0.025		0.024	-0.019	-0.005
	(-1.405)		(0.444)		(0.436)	(-1.519)	(-0.291)
PWHITE2	0.012	0.003	-0.005	-0.001	-0.004		-0.0002
	(1.559)	(1.732)	(-1.217)	(-1.629)	(-1.033)		(-0.207)

Explanatory Variable	Dependent Variable College Prep. Pgm. S.F.	 Expectations R.F.	 S.F.	 Self Esteem R.F.	 S.F.	 Control R.F.	 S.F.
AVSES	-0.076	-0.091		-0.066		-0.026	
	(-9.046)	(-2.452)		(-1.499)		(-0.898)	
PWPICLY	0.017	0.030		-0.061		0.075	
	(2.273)	(0.180)		(-0.306)		(0.579)	
PWPICLY2		0.001		0.018		-0.009	
		(0.050)		(0.652)		(-0.525)	
PWHITE	-0.007	-0.033		0.018		-0.076	
	(-2.307)	(-0.530)		(0.252)		(-1.595)	
PWHITE2		0.001		-0.003	-0.001	0.005	
		(0.260)		(-0.544)	(-1.303)	(1.578)	

AV 5

Table 10b: Estimated Coefficients of the Teacher's Variables: Whites

Explanatory Variable	Dependent Variable: Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
TAVR	0.046	0.084	-0.044		-0.024		-0.006
	(0.915)	(1.908)	(-1.811)		(-1.005)		(-0.841)
NTPRPUP	8.037	9.075	-6.256	5.104	-1.558	6.107	-0.142
	(1.332)	(1.775)	(-2.150)	(2.194)	(-0.546)	(1.961)	(-1.535)
TANYTCH	0.083		0.055	0.050	0.102	0.108	0.003
	(0.977)		(1.349)	(1.603)	(2.545)	(2.785)	(0.253)
FWTCHLY	0.119		0.104	0.046	0.038		0.006
	(1.922)		(3.469)	(1.865)	(1.311)		(0.666)
TASEX	-0.263	-0.327	0.021		0.061		0.035
	(-1.277)	(-2.062)	(0.210)		(0.629)		(1.089)
TPTC	-0.312	-0.352	0.138		0.033		0.031
	(-1.131)	(-1.733)	(1.037)		(0.253)		(0.722)
TRADTN	0.365		-0.156		0.215	0.284	0.034
	(1.128)		(-1.002)		(1.404)	(1.742)	(0.682)

Explanatory Variable	Dependent Variable: College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
TAVR	-0.010	0.024	0.050	-0.035		-0.018	
	(-1.625)	(0.900)	(2.331)	(-1.078)		(-0.845)	
NTPRPUP		-4.217		-0.663		-0.207	
		(-1.308)		(-0.172)		(-0.083)	
TANYTCH		0.058	0.050	-0.057		-0.024	-0.031
		(1.506)	(1.481)	(-1.050)		(-0.677)	(-1.315)

Table 10b: (Cont.)

Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
PWTCHLY		0.037		0.034	-0.075	0.093	0.071
		(1.116)		(0.856)	(-2.179)	(0.363)	(3.356)
TASEX		0.126	0.138	0.008		0.039	
		(1.149)	(1.613)	(0.060)		(0.458)	
TPTC		0.305	0.295	-0.089	-0.270	0.041	
		(2.070)	(2.684)	(-0.505)	(-2.049)	(0.360)	
TPADTN		0.147	0.159	-0.250	-0.194	0.00002	
		(0.852)	(1.144)	(-1.213)	(-1.120)	(0.0002)	

Table 11b: Estimated Coefficients of the School Characteristics Variables: Whites

Explanatory Variable	Achievement R.F.	Achievement S.F.	Achievement Motivation R.F.	Achievement Motivation S.F.	Demonstrated Motivation R.F.	Demonstrated Motivation S.F.	College Prep Pgm R.F.
	Dependent Variable						
FACILITS	-0.056		-0.028		-0.015		-0.005
	(-1.643)		(-1.733)		(-0.716)		(-0.886)
PROBLEMS	-0.016	-0.037	-0.021	-0.016	0.002		0.0006
	(-0.742)	(-1.939)	(-2.029)	(-1.856)	(0.154)		(0.174)
AGES	-0.005		-0.005	0.016	-0.019		-0.002
	(-0.182)		(-0.359)	(1.409)	(-1.374)		(-0.362)
TEST	0.291	0.277	-0.133		-0.080		0.009
	(2.784)	(3.021)	(-2.629)		(-1.607)		(0.551)
ERPCPREP	2.155		1.156		0.299		0.928
	(6.192)		(6.886)		(1.813)		(17.341)
NTCHLV	0.0002		0.019	0.027	-0.032	-0.026	-0.0005
	(0.005)		(1.127)	(1.979)	(-1.986)	(-1.455)	(-0.093)
RMANDG	-0.062		0.023		0.008		-0.0005
	(-0.779)		(0.598)		(0.218)		(-0.040)

Table 11b: (cont.)

	Dependent Variable						
Explanatory Variable	College Prep. Pgm	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
FACILITS		-0.021		-0.036		-0.020	
		(-1.145)		(-1.645)		(-1.439)	
PROBLEMS		0.001		0.023	0.014	0.015	
		(0.109)		(1.650)	(4.544)	(1.613)	
AGES		-0.009		0.019		0.010	
		(-0.567)		(1.034)		(0.802)	
TEST		-0.029		-0.028		0.011	
		(-0.513)		(-0.421)		(0.251)	
PRPCPREP	0.697	1.181		0.633		0.339	
	(14.483)	(6.351)		(2.854)		(2.358)	
NTCHLV		0.006		-0.040	-0.021	-0.007	
		(0.350)		(-1.827)	(-1.179)	(-0.521)	
PRMANDG		0.002		0.088	0.076	-0.038	-0.070
		(0.534)		(1.746)	(1.784)	(-1.176)	(-2.681)

Table 12b: Estimated Coefficients of the Regional and Other Variables and the Multiple Correlation Coefficients: Whites

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SMSA	0.054		-0.080	-0.100	0.002		0.006
	(0.453)		(-1.382)	(-2.377)	(0.027)		(0.308)
NEWENG	-0.061		-0.367		0.292	0.523	-0.018
	(-0.264)		(-3.296)		(2.672)	(4.420)	(-0.500)
MIDATL	0.162	0.217	-0.228		0.017	0.139	-0.016
	(0.917)	(1.713)	(-2.676)		(0.200)	(1.736)	(-0.575)
LAKES	0.061	0.168	-0.138		0.059	0.146	0.0003
	(0.400)	(1.557)	(-1.884)		(0.821)	(2.018)	(0.015)
PLAINS	0.772	0.650	-0.090		0.158	0.216	-0.004
	(3.932)	(4.097)	(-0.950)		(1.696)	(2.215)	(-0.118)
SEAST	0.215		0.308	0.088	0.363	0.224	-0.025
	(1.088)		(3.230)	(1.546)	(3.877)	(3.049)	(-0.815)
SWEST	0.222		0.353		0.248		-0.0003
	(1.072)		(3.542)		(2.531)		(-0.008)
NTLKGC	0.187		0.103		0.036		0.025
	(4.929)		(5.620)		(2.010)		(4.339)
NHWTV	-0.175	-0.098	-0.099	-0.011	-0.042		-0.028
	(-7.993)	(-4.455)	(-9.380)	(-1.190)	(-4.104)		(-8.310)
CONST	4.453	5.769	5.412	1.633	-1.272	-2.833	0.602
	(1.086)	(1.606)	(2.737)	(1.003)	(-0.656)	(-6.266)	(0.955)
R^2	0.2654	0.2616	0.2649	0.2643	0.1509	0.1495	0.2940
MLR^2	0.2654	0.4403	0.2649	0.6565	0.1509	0.1787	0.2940

AV 10

Table 12b: (cont.)

Explanatory Variable	College Prep. Pgm	Expectations		Self Esteem		Control	
	Dependent Variable						
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SMSA		0.015		0.157		0.108	0.072
		(0.228)		(2.051)		(2.186)	(1.789)
NEWENG	0.028	-0.280		-0.161		0.043	0.087
	(1.169)	(-2.273)		(-1.092)		(0.449)	(1.167)
MIDATL	0.040	-0.372	-0.251	0.086	0.129	-0.010	
	(2.507)	(-3.929)	(-4.076)	(0.766)	(1.874)	(-0.144)	
LAKES	0.051	-0.334	-0.225	-0.012		-0.056	
	(3.337)	(-4.113)	(-4.296)	(-0.120)		(-0.893)	
PLAINS		-0.086		0.004	-0.191	0.145	0.127
		(-0.817)		(0.029)	(-1.949)	(1.787)	(1.851)
SEAST		-0.085	-0.212	0.295		0.153	0.085
		(-0.801)	(-3.106)	(2.344)		(1.873)	(1.691)
SWEST	-0.023	0.213		0.272		0.116	
	(-1.054)	(1.928)		(2.061)		(1.361)	
NTLKGC		0.153	0.076	0.126		0.100	0.041
		(7.570)	(4.210)	(5.239)		(6.362)	(2.658)
NHWTV	-0.012	-0.078		-0.098	-0.027	-0.027	0.015
	(-3.781)	(-6.660)		(-6.998)	(-1.944)	(-2.956)	(1.544)
CONST	0.550	0.379	-2.163	-1.705		-1.607	
	(3.307)	(0.173)	(-3.596)	(-0.652)		(-0.949)	
R^2	0.2934	0.3063	0.3058	0.1374	0.1359	0.1329	0.1316
MLR^2	0.5115	0.3063	0.5300	0.1374	0.4714	0.1329	0.3097

AV.11

Table 7: Structural Form Coefficients of the Endogenous Variables: Asian Americans

Explanatory Variable	Dependent Variable ACH	ACHMOT	DEMMOT	CPREP	EXP	SELFEST	CONTROL
ACH		0.119 (3.001)	0.090 (2.062)	0.046 (3.494)			0.099 (2.523)
ACHMOT					0.449 (2.982)		0.190 (2.103)
DEMMOT					0.213 (2.163)		
CPREP	3.216 (4.508)						
EXP			0.308 (1.621)	0.193 (7.718)			
SELFEST					0.188 (2.152)		0.260 (2.684)
CONTROL	1.566 (4.637)					0.240 (1.352)	
PPAEXP		0.464 (7.276)	0.248 (1.822)		0.181 (2.399)		
PTEXP						0.691 (3.892)	0.103 (1.117)

7

AV.12

Table 8: Estimated Coefficients of the Demographic and Home Background Variables Asian Americans

Explanatory	Dependent Variable						
			Achievement		Demonstrated		College
Variable	Achievement		Motivation		Motivation		Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SEX	-0.033	-0.394	0.060	0.187	0.237	0.304	0.002
	(-0.387)	(-3.515)	(1.577)	(5.256)	(6.352)	(5.503)	(0.142)
AGE	-0.246	-0.108	-0.080		-0.017		-0.031
	(-2.219)	(-1.000)	(-1.620)		(-0.342)		(-1.872)
SES	0.243		0.138		0.042	-0.086	0.042
	(4.721)		(6.016)		(1.851)	(-2.647)	(5.447)
INFO	0.348		0.215	0.052	0.155		0.048
	(5.337)		(7.402)	(1.719)	(5.442)		(4.905)
TWOP	0.415		0.020	-0.179	0.306	0.138	0.077
	(1.937)		(0.213)	(-2.129)	(3.267)	(1.237)	(2.381)
NOBAS	-0.163		-0.077		-0.050		-0.018
	(-3.557)		(-3.763)		(-2.487)		(-2.565)
FL	0.052	0.144	-0.167	-0.083	-0.105		-0.043
	(0.613)	(1.534)	(-4.383)	(-2.502)	(-2.801)		(-3.345)
RBS	0.092		-0.017	-0.034	0.046		0.009
	(1.125)		(-0.479)	(-1.103)	(1.293)		(0.752)
PTAAT	0.016		0.038		0.018		0.022
	(0.179)		(0.941)		(0.451)		(1.581)
PTAS	0.257		-0.031	0.037	-0.043		0.005
	(3.237)		(-0.869)	(1.003)	(-1.239)		(0.445)
TC	0.801		0.242		-0.045	-0.271	0.094
	(3.478)		(2.362)		(-0.451)	(-2.315)	(2.690)

Table 8: (Cont.)

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep Pgm.
	R.F	S.F.	R.F.	S.F.	R.F.	S.F	R.F.
NTCHSCL	-0.112	-0.091	0.060	0.066	-0.072	-0.063	-0.007
	(-1.518)	(-1.322)	(1.815)	(2.342)	(-2.225)	(-1.832)	(-0.648)
LSTCHSCL	0.297	0.128	0.154	0.086	0.087		0.010
	(4.545)	(1.835)	(5.295)	(3.250)	(3.021)		(0.971)

Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SEX		0.009		-0.067	-0.078	0.222	0.234
		(0.211)		(-1.346)	(-1.233)	(5.991)	(6.590)
AGE	-0.016	-0.025		0.002		-0.025	
	(-1.122)	(-0.467)		(0.025)		(-0.518)	
SES		0.132		0.113	0.045	0.084	
		(5.318)		(3.746)	(1.373)	(3.724)	
INFO	-0.012	0.229	0.035	0.062		0.095	
	(-1.163)	(7.318)	(1.052)	(1.623)		(3.351)	
TWOP	0.030	0.133		-0.062		0.120	0.105
	(1.065)	(1.292)		(-0.495)		(1.288)	(1.213)
NOBAS		-0.058		-0.023		-0.048	
		(-2.636)		(-0.873)		(-2.397)	
FL		-0.212	-0.068	-0.059		0.037	0.089
		(-5.162)	(-1.862)	(-1.188)		(0.997)	(2.461)

Table 8: (Cont.)

	Dependent Variable						
Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
RBS		0.062		0.181	0.127	0.012	-0.049
		(1.567)		(3.774)	(2.829)	(0.347)	(-1.381)
PTAAT	0.018	0.013		-0.027	-0.060	-0.033	-0.039
	(1.578)	(0.300)		(-0.500)	(-1.180)	(-0.836)	(-1.106)
PTAS		-0.058		0.037		0.034	
		(-1.520)		(0.794)		(0.980)	
TC		0.253		0.322		0.254	
		(2.289)		(2.381)		(2.533)	
NTCHSCL		-0.018	-0.038	0.066	0.061	-0.0002	
		(-0.518)	(-1.194)	(1.521)	(1.548)	(-0.008)	
LSTCHSCL	-0.018	0.070	-0.053	0.149	0.114	0.094	
	(-2.098)	(2.233)	(-1.648)	(3.868)	(2.810)	(3.313)	

Table 9: Estimated Coefficients of the School's Student Composition Variables Asian Americans

Dependent Variable

Explanatory Variable	Achievement R.F.	Achievement S.F.	Achievement Motivation R.F.	Achievement Motivation S.F.	Demonstrated Motivation R.F.	Demonstrated Motivation S.F.	College Prep. Pgm. R.F.
--							
AVSES	0.176	0.390	-0.196	-0.099	-0.012		-0.086
	(0.674)	(2.171)	(-1.684)	(-1.531)	(-0.104)		(-2.180)
PWPICLY	1.078	0.642	0.302		0.121		0.044
	(2.312)	(1.512)	(1.451)		(0.593)		(0.626)
PWPICLY2	-0.218	-0.131	-0.059		-0.028		-0.011
	(-3.033)	(-1.976)	(-1.848)		(-0.891)		(-1.013)
PWHITE	-0.158		0.086	-0.036	0.109	-0.057	0.016
	(-0.638)		(0.776)	(-2.468)	(0.999)	(-2.885)	(0.429)
PWHITE2	0.020	0.004	-0.007		-0.011		-0.0007
	(1.037)	(1.231)	(-0.766)		(-1.316)		(-0.235)

Dependent Variable

Explanatory Variable	College Prep. Pgm. S.F.	Expections R.F.	Expections S.F.	Self Esteem R.F.	Self Esteem S.F.	Control R.F.	Control S.F.
AVSES	-0.048	-0.191		0.194	0.200	0.034	
	(-1.942)	(-1.515)		(1.261)	(2.153)	(0.296)	
PWPICLY		0.309		0.271		0.218	0.043
		(1.380)		(0.989)		(1.074)	(1.423)
PWPICLY2		-0.057		-0.043		-0.034	
		(-1.649)		(-1.029)		(-1.082)	
PWHITE		0.085	0.027	-0.148		-0.069	
		(0.713)	(1.703)	(-1.011)		(-0.640)	
PWHITE2		-0.004		0.015		0.007	
		(-0.470)		(1.350)		(0.796)	

Table 10: Estimated Coefficients of the Teachers' Variables: Asian Americans

Explanatory Variable	Dependent Variable						
	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
TAVR	0.407	0.416	-0.073	-0.051	0.094		0.004
	(2.738)	(3.537)	(-1.104)	(-3.859)	(1.452)		(0.162)
NTPRPUP	38.816		9.604		-10.782	-19.699	2.677
	(1.379)		(0.765)		(-0.875)	(-2.034)	(0.628)
TANYTCH	-0.306	-0.407	0.214		0.152		0.024
	(-1.001)	(-2.356)	(1.568)		(1.139)		(0.520)
PWTCHLY	-0.022		0.027	0.029	0.075	0.102	-0.014
	(-0.232)		(0.657)	(1.146)	(1.847)	(3.064)	(-0.984)
TASEX	2.300	1.736	0.582		0.254		0.048
	(3.842)	(3.796)	(2.179)		(0.968)		(0.530)
TPTC	0.161		-0.409		-0.971	-0.425	-0.271
	(0.182)		(-1.035)		(-2.505)	(-1.486)	(-2.024)
TPADTN	-1.459		-1.941	-0.849	-1.767	-1.196	0.006
	(-1.027)		(-3.064)	(-2.370)	(-2.841)	(-2.152)	(0.030)

AV.17

Table 10: Estimated Coefficients of the Teachers' Variables (Cont'd)

Explanatory Variable	Dependent Variable College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
TAVR	-0.042 (-2.997)	0.039 (0.544)	0.066 (1.502)	-0.122 (-1.393)		-0.035 (-0.547)	
NTPRPUP		12.114 (0.895)		19.866 (1.202)		9.206 (0.751)	
TANYTCH		0.250 (1.701)		0.173 (0.962)		0.171 (1.283)	0.103 (1.283)
PWTCHLY		-0.061 (-1.368)	-0.075 (-2.737)	-0.037 (-0.683)		-0.010 (-0.242)	
TASEX		-0.062 (-0.214)	-0.597 (-3.344)	0.329 (0.935)		0.289 (1.107)	-0.287 (-1.785)
TPTC	-0.085 (-1.250)	-0.770 (-1.809)		-0.019 (-0.036)		0.164 (0.425)	0.297 (1.117)
TPADTN		-0.641 (-0.937)	1.187 (2.149)	-1.451 (-1.740)		-1.273 (-2.057)	

Table 11: Estimated Coefficients of the School characteristics Variables

Explanatory Variable	Dependent Variable Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
FACILITS	0.099		-0.059		-0.044		0.0004
	(0.978)		(-1.313)		(-0.995)		(0.025)
PROBLEMS	0.135		-0.022		0.046	0.062	0.005
	(1.744)		(-0.622)		(1.362)	(2.003)	(0.386)
AGES	-0.136		0.021		0.046		-0.005
	(-1.326)		(0.464)		(1.030)		(-0.301)
PRPCPREP	1.712		0.901		-0.023		0.494
	(1.194)		(1.409)		(-0.037)		(2.276)
NTCHLV	0.011		0.064		-0.070	-0.110	-0.014
	(0.100)		(1.334)		(-1.490)	(-3.011)	(-0.865)
PRNMADG	-0.309		0.220	0.133	-0.100	-0.138	0.005
	(-1.681)		(2.690)	(2.338)	(-1.245)	(-1.818)	(0.187)

Table 11: (Cont.)

Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
FACILITS		-0.003 (-0.066)	0.060 (2.165)	-0.020 (-0.339)		0.032 (0.726)	
PROBLEMS	0.009 (4.264)	-0.057 (-1.516)	-0.055 (-2.330)	0.088 (1.936)	0.096 (2.845)	0.021 (0.607)	
AGES		0.012 (0.237)		-0.014 (-0.228)	-0.032 (-1.043)	-0.052 (-1.158)	
PRPCPREP	0.331 (2.013)	0.452 (0.655)		-1.333 (-1.583)		-0.371 (-0.595)	
NTCHLV	-0.022 (-2.069)	0.041 (0.784)		0.032 (0.506)		0.060 (1.703)	0.085 (2.737)
PRNMADG		0.134 (1.516)		-0.206 (-1.909)	-0.208 (-2.451)	-0.132 (-1.655)	-0.113 (-2.164)

Dependent Variable

Table 12: Estimated Coefficients of the Regional and other Variables, and the Multiple Correlation Coefficients, Asian Americans

Explanatory Variable	Dependent Variable: Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SMSA	0.460	0.457	-0.042		0.028	0.164	-0.054
	(1.218)	(1.592)	(-0.252)		(0.167)	(1.246)	(-0.946)
NEWENG	-0.378		-0.945		-0.731		-0.002
	(-0.349)		(-1.956)		(-1.543)		(-0.011)
MIDATL	-2.005	-1.187	-0.060		-0.088		0.094
	(-3.387)	(-3.342)	(-0.228)		(-0.341)		(1.045)
LAKES	-0.544	-0.668	-0.281		-0.563	-0.276	0.017
	(-0.980)	(-1.382)	(-1.134)		(-2.316)	(-1.126)	(0.205)
PLAINS	-0.516		0.041		0.251		0.086
	(-0.633)		(0.113)		(0.702)		(0.698)
SEAST	-1.866		-0.216		-0.541	-0.546	-0.195
	(-2.015)		(-0.524)		(-1.335)	(-1.456)	(-1.387)
SWEST	-2.078	-1.900	0.290		0.480		0.100
	(-2.565)	(-2.664)	(0.802)		(1.352)		(0.813)
NTLKGC	0.237	-0.090	0.150	0.032	-0.025	-0.144	0.036
	(2.877)	(-1.061)	(4.082)	(1.011)	(-0.702)	(-3.437)	(3.065)
NHWTV	-0.090	0.059	-0.072	-0.018	-0.062		-0.029
	(-2.111)	(1.325)	(-3.831)	(-1.061)	(-3.320)		(-4.453)
CONST	-41.500	-14.456	1.217		-10.264	-8.999	-0.658
	(-2.973)	(-4.674)	(0.196)		(-1.600)	(-1.754)	(-0.311)
R^2	0.2473	0.2417	0.2725	0.2697	0.2229	0.2197	0.2054
MLR^2	0.2473	0.5677	0.2725	0.5909	0.2229	0.3023	0.2054

AV. 21

Table 12: (Cont.)

Explanatory Variables	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SMSA		-0.225		-0.211	-0.323	0.085	
		(-1.240)		(-0.953)	(-2.160)	(0.518)	
NEWENG		-0.863		-0.489		-0.412	
		(-1.656)		(-0.769)		(-0.874)	
MIDATL	0.149	0.066		0.040		-0.392	-0.310
	(3.294)	(0.233)		(0.115)		(-1.521)	(-2.114)
LAKES	0.097	-0.409		0.150		0.075	
	(1.550)	(-1.529)		(0.459)		(0.309)	
PLAINS	0.124	-0.271	-0.530	0.069		-0.442	-0.408
	(1.311)	(-0.691)	(-1.771)	(0.144)	-	(-1.245)	(-1.417)
SEAST	-0.108	-0.345		-0.936	-0.524	-0.767	
	(-1.099)	(-0.775)		(-1.725)	(-1.214)	(-1.903)	
SWEST		0.491		-0.432		-0.269	
		(1.260)		(-0.906)		(-0.762)	
NTLKGC		0.133		0.244	0.119	0.136	
		(3.353)		(5.064)	(2.337)	(3.792)	
NHWTV	-0.009	-0.084		-0.061	-0.055	-0.035	
	(-1.480)	(-4.093)		(-2.432)	(-2.341)	(-1.908)	
CONST.		7.064	9.345	-14.225	-13.240	-5.850	
		(1.052)	(2.215)	(-1.736)	(-2.306)	(-0.963)	
R^2	0.2023	0.2541	0.2517	0.1314	0.1277	0.1517	0.1493
MLR^2	0.5528	0.2541	0.5458	0.1314	0.3194	0.1517	0.3754

Dependent Variable

Table 7e: Structural Form Coefficients of the Endogenous Variables: Native Americans

Explanatory Variable	ACH	ACHMOT	DEMMOT	CPREP	EXP	SELFEST	CONTROL
			Dependent Variable				
ACH				0.037 (3.096)		0.278 (4.189)	0.092 (1.847)
ACHMOT					0.649 (4.947)		
DEMMOT							
CPREP	2.876 (4.522)	0.465 (1.139)			1.227 (3.631)		
EXP		0.204 (1.288)	0.276 (1.497)	0.254 (7.994)			
SELFEST			-0.349 (-2.607)				0.306 (2.861)
CONTROL	0.303 (1.212)						
PPAEXP		0.253 (3.613)	0.364 (3.788)				
PTEXP		0.345 (2.335)				0.740 (6.367)	

Table 8e: Estimated Coefficients of the Demographic and Home Background Variables: Native Americans

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	Dependent Variable						
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SEX	-0.367	-0.305	0.001	0.115	0.190	0.235	-0.040
	(-3.899)	(-3.173)	(0.030)	(2.544)	(3.594)	(3.815)	(-2.787)
AGE	-0.310	-0.215	-0.104		-0.059		-0.031
	(-3.388)	(-2.558)	(-2.211)		(-1.145)		(-2.213)
SES	0.263	0.116	0.075	-0.052	-0.023	-0.119	0.039
	(4.842)	(2.092)	(2.669)	(-1.750)	(-0.754)	(-2.700)	(4.707)
INFO	-0.027	-0.101	0.084	0.058	0.138	0.138	0.020
	(-0.423)	(-1.706)	(2.531)	(1.999)	(3.826)	(3.512)	(2.059)
TWOP	0.314	0.219	0.131		-0.112	-0.190	0.244
	(1.622)	(1.235)	(1.312)		(-1.028)	(-1.485)	(0.826)
NOBAS	-0.141	-0.112	-0.023		-0.027		-0.010
	(-3.337)	(-2.840)	(-1.062)		(-1.129)		(-1.475)
FL	-0.116		-0.071	0.050	0.063	0.068	-0.043
	(-1.343)		(-1.602)	(1.244)	(1.301)	(1.149)	(-3.253)
RBS	0.073		0.135		0.071		-0.006
	(0.799)		(2.867)		(1.375)		(-0.440)
PTAAT	-0.181		-0.0002		0.004		-0.008
	(-1.849)		(-0.003)		(0.068)		(-0.534)
PTAS	0.045		-0.097		-0.225	-0.109	-0.009
	(0.532)		(-2.213)		(-4.708)	(-1.804)	(-0.683)
TC	0.344	0.313	0.143	0.198	0.065	0.157	-0.001
	(1.608)	(1.561)	(1.314)	(2.207)	(0.540)	(1.144)	(-0.043)

Table 8e: (Cont.)

Dependent Variable

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
NTCHSCL	-0.047		-0.039		-0.115	-0.106	-0.016
	(-0.699)		(-1.132)		(-3.041)	(-2.628)	(-1.573)
LSTCHSCL	0.043		0.003		0.038		-0.001
	(0.741)		(0.106)		(1.169)		(-0.154)

Table 8e: (Cont.)

Explanatory Variable	College Prep.Pgm.	Dependent Variable Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SEX		-0.048		-0.128		0.153	0.224
		(-0.967)		(-1.970)		(3.155)	(4.915)
AGE		-0.036	0.067	-0.020	0.076	0.031	0.067
		(-0.749)	(1.496)	(-0.320)	(1.229)	(0.646)	(1.536)
SES		0.135	0.040	0.122		0.041	
		(4.768)	(1.411)	(3.249)		(1.476)	
INFO		0.046	-0.036	0.024		0.029	
		(1.376)	(-1.095)	(0.534)		(0.887)	
TWOP		-0.072	-0.185	0.115		0.076	
		(-0.709)	(-2.001)	(0.859)		(0.759)	
NOBAS		-0.035		-0.010	0.050	-0.013	
		(-1.596)		(-0.346)	(1.632)	(-0.603)	
FL		-0.132		-0.199	-0.083	-0.017	0.058
		(-2.919)		(-3.331)	(-1.373)	(-0.381)	(1.379)
RBS	-0.034	0.107		0.093		0.170	0.130
	(-2.344)	(2.244)		(1.470)		(3.600)	(3.196)
PTAAT	-0.021	0.087	0.105	0.073	0.150	0.020	
	(-1.252)	(1.708)	(2.264)	(1.081)	(2.457)	(0.395)	
PTAS		-0.073		-0.046		0.026	
		(-1.640)		(-0.789)		(0.599)	
TC		-0.080	-0.162	0.221	0.214	0.184	
		(-0.712)	(-1.644)	(1.498)	(1.528)	(1.663)	
NTCHSCL		-0.073		0.022	0.044	-0.037	-0.047
		(-2.085)		(0.481)	(1.046)	(-1.055)	(-1.588)
LSTCHSCL		-0.007		0.031		0.055	0.048
		(-0.233)		(0.784)		(1.838)	(1.909)

Table 9e: Estimated Coefficients of the School's Student Composition Variables: Native Americans

Dependent Variable

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
AVSES	-0.048	0.127	0.016		0.016		-0.067
	(-0.321)	(1.099)	(0.211)		(0.189)		(-2.944)
PWPICLY	-0.567		-0.640	0.044	0.090	0.418	-0.081
	(-1.174)		(-2.569)	(1.138)	(0.330)	(1.635)	(-1.091)
PWPICLY2	0.107	0.021	0.110		0.004	-0.062	0.014
	(1.438)	(1.511)	(2.865)		(0.106)	(-1.512)	(1.234)
PWHITE	-0.221		-0.012		-0.284		-0.044
	(-1.113)		(-0.117)		(-2.545)		(-1.449)
PWHITE2	0.030	0.014	-0.003		0.015		0.003
	(2.044)	(4.390)	(-0.428)		(1.835)		(1.300)

Dependent Variable

Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
AVSES	-0.066	-0.006	0.070	-0.170	-0.222	-0.082	
	(-3.381)	(-0.082)	(1.376)	(-1.650)	(-3.091)	(-1.067)	
PWPICLY		-0.643		-0.598		0.183	0.415
		(-2.547)		(-1.791)		(0.732)	(2.152)
PWPICLY2		0.105		0.086		-0.361	-0.071
		(2.686)		(1.674)		(-0.957)	(-2.398)
PWHITE		0.051		0.184	0.282	0.019	0.037
		(0.494)		(1.336)	(2.865)	(0.189)	(2.060)
PWHITE2		-0.007		-0.009	-0.018	0.005	
		(-0.848)		(-0.863)	(-2.415)	(0.661)	

Table 10e: Estimated Coefficients of the Teachers' Variables: Native Americans

Explanatory Variable	Dependent Variable: Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
TAVR	0.097	0.092	-0.033		0.056		0.003
	(1.141)	(1.780)	(-0.749)		(1.183)		(0.232)
NTPRPUP	19.783	23.942	0.044		-23.725		-1.218
	(1.268)	(1.987)	(0.005)		(-2.710)		(-0.511)
TANYTCH	-0.035	-0.205	0.120		-0.074		0.043
	(-0.194)	(-1.307)	(1.272)		(-0.721)		(1.542)
PTWCHLY	0.201		0.152		0.043		0.038
	(2.180)		(3.202)		(0.821)		(2.687)
TASEX	-0.265		-0.027		0.363		0.055
	(-0.544)		(-0.108)		(1.327)		(0.741)
TPTC	-0.693	-1.026	0.462	0.353	0.305		0.039
	(-1.075)	(-1.919)	(1.392)	(1.671)	(0.843)		(0.400)
TPADTN	0.754		0.615		-0.029	-0.482	0.186
	(0.908)		(1.437)		(-0.625)	(-1.033)	(1.464)

Table 10e: (Cont.)

Dependent Variable

Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
TAVR		-0.020		-0.015		0.004	
		(-0.451)		(-0.256)		(0.098)	
NTPRPUP		-3.529		16.870		4.707	
		(-0.433)		(1.564)		(0.584)	
TANYTCH	0.033	0.076		0.453	0.334	0.264	0.159
	(1.386)	(0.800)		(3.594)	(3.986)	(2.802)	(2.046)
PWTCHLY		0.147		0.064	-0.069	0.083	0.050
		(3.054)		(0.997)	(-1.242)	(1.734)	(1.215)
TASEX	-0.086	0.501	0.460	-0.142		-0.206	
	(-1.377)	(1.968)	(2.115)	(-0.421)		(-0.817)	
TPTC		0.275		-0.314		-0.058	
		(0.816)		(-0.704)		(-0.173)	
TPADTN		0.724		0.714	0.812	0.467	
		(1.667)		(1.243)	(1.580)	(1.088)	

Table 11e: Estimated Coefficients of the School Characteristics Variables: Native Americans

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	Dependent Variable						
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
FACILITS	-0.119	-0.120	0.004		0.064		0.005
	(-1.816)	(-2.151)	(0.109)		(1.738)		(0.530)
PROBLEMS	-0.044		0.003	0.036	-0.016		-0.0003
	(-1.076)		(0.147)	(2.004)	(-0.684)		(-0.047)
AGES	0.108	0.146	0.001		0.034	0.071	-0.019
	(1.607)	(2.316)	(0.036)		(0.914)	(1.903)	(-1.824)
TEST	0.181		-0.064		-0.010		0.029
	(0.711)		(-0.487)		(-0.069)		(0.745)
PRPCPREP	2.344		0.725		0.220		0.963
	(2.541)		(1.523)		(0.426)		(6.836)
NTCHLV	0.189	0.187	0.091	0.054	-0.041		-0.003
	(2.514)	(2.766)	(2.342)	(1.833)	(-0.979)		(-0.239)
PRNMADG	-0.155	-0.342	0.141		-0.115	-0.153	0.030
	(-0.772)	(-1.996)	(1.365)		(-1.022)	(-1.293)	(0.968)

Table 11e: (Cont.)

	Dependent Variable						
Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
FACILITS	0.010	0.002		-0.082		0.015	0.045
	(1.070)	(0.070)		(-1.801)		(0.434)	(1.777)
PROBLEMS	0.015	-0.052	-0.056	-0.035		-0.007	
	(2.512)	(-2.424)	(-3.209)	(-1.244)		(-0.342)	
AGES		-0.068	-0.052	0.020		0.031	
		(-1.946)	(-1.740)	(0.427)		(0.907)	
TEST		0.092		-0.174		0.040	
		(0.687)		(-0.987)		(0.305)	
PRPCPREP	0.431	1.872		0.111		0.319	
	(2.945)	(3.885)		(0.173)		(0.669)	
NTCHLV		-0.005	-0.053	0.099		0.087	0.040
		(-0.123)	(-1.573)	(1.902)		(2.234)	(1.239)
PRNMADG		0.102		0.221		0.154	
		(0.979)		(1.598)		(1.493)	

Table 12e: Estimated Coefficients of the Regional and Other Variables and the Multiple Correlation Coefficients: Native Americans

Explanatory Variable	Dependent Variable: Achievement R.F.	Achievement S.F.	Achievement Motivation R.F.	Achievement Motivation S.F.	Demonstrated Motivation R.F.	Demonstrated Motivation S.F.	College Prep.Pgm. R.F.
SMSA	-0.646	-0.444	0.175	0.207	0.508	0.504	-0.041
	(-2.048)	(-1.773)	(1.075)	(1.738)	(2.872)	(3.580)	(-0.853)
NEWENG	-0.939		-0.924	-0.420	-0.020	0.448	-0.252
	(-1.547)		(-2.950)	(-1.801)	(-0.058)	(1.345)	(-2.722)
MIDATL	0.015	0.337	-0.037		-0.202		-0.053
	(0.037)	(1.149)	(-0.184)		(-0.913)		(-0.877)
LAKES	-0.806		-0.050		-0.135		-0.142
	(-1.999)		(-0.239)		(-0.599)		(-2.300)
PLAINS	0.829	0.782	0.228		-0.989	-0.629	-0.023
	(1.226)	(1.225)	(0.655)		(-2.606)	(-1.520)	(-0.209)
SEAST	-0.565		0.102		-0.480		-0.177
	(-1.200)		(0.418)		(-1.818)		(-2.467)
SWEST	-0.361	-0.450	0.481	0.135	0.342		0.023
	(-1.175)	(-1.781)	(3.039)	(1.145)	(1.985)		(0.497)
NTLKGC	0.090	-0.094	0.141	0.057	0.125	0.151	0.043
	(1.185)	(-1.162)	(3.617)	(1.483)	(2.942)	(2.674)	(3.717)
NHWTV	-0.013		-0.082	-0.040	-0.036		-0.008
	(-0.304)		(-3.695)	(-1.979)	(-1.478)		(-1.270)
CONST	7.972		-0.939	-6.047	0.513	-2.002	0.095
	(1.034)		(-0.236)	(-2.031)	(0.119)	(-2.779)	(0.081)
R^2	0.3250	0.3184	0.2264	0.2206	0.2066	0.1996	0.2426
MLR^2	0.3250	0.4455	0.2264	0.5351	0.2066	0.2840	0.2426

Table 12e: (Cont.)

Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SMSA	-0.056	0.128		-0.060		0.048	0.131
	(-1.446)	(0.779)		(-0.277)		(0.296)	(1.157)
NEWENG		-0.785		-0.267		-0.267	
		(-2.473)		(-0.637)		(-0.852)	
MIDATL		-0.279	-0.268	0.191		-0.185	-0.265
		(-1.350)	(-1.862)	(0.698)		(-0.905)	(-2.090)
LAKES		-0.481	-0.387	-0.639	-0.512	-0.259	
		(-2.285)	(-2.259)	(-2.293)	(-2.258)	(-1.244)	
PLAINS		-0.469	-0.614	0.641		0.588	
		(-1.327)	(-1.915)	(1.372)		(1.682)	
SEAST		-0.503	-0.446	-0.055		-0.044	
		(-2.046)	(-2.356)	(-0.169)		(-0.181)	
SWEST		0.052	-0.287	-0.301	-0.425	-0.051	
		(0.322)	(-1.935)	(-1.420)	(-2.517)	(-0.319)	
NTLKGC		0.125		0.205	0.113	0.148	0.07[illegible]
		(3.166)		(3.921)	(2.225)	(3.782)	(1.903)
NHWTV	-0.007	-0.006	0.057	-0.022		-0.011	
	(-1.027)	(-0.266)	(2.562)	(-0.753)		(-0.506)	
CONST	-2.132	7.321	7.940	3.751		-3.842	-4.219
	(-2.007)	(1.818)	(2.642)	(0.704)		(-0.964)	(-6.140)
R^2	0.2330	0.2328	0.2290	0.1534	0.1499	0.1654	0.1599
MLR^2	0.5369	0.2328	0.5439	0.1534	0.4259	0.1654	0.3599

Table 7d: Structural Form Coefficients of the Endogenous Variables: Mexican Americans

Explanatory Variable	Dependent Variable ACH	ACHMOT	DEMMOT	CPREP	EXP	SELFEST	CONTROL
ACH						0.114	0.129
						(2.148)	(3.120)
ACHMOT			0.730				
			(4.497)				
DEMMOT		0.410					0.126
		(7.449)					(2.366)
CPREP					0.855		0.451
					(3.054)		(1.803)
EXP		0.231		0.093			
		(1.791)		(4.353)			
SELFEST		0.266			0.305		0.197
		(3.248)			(2.935)		(2.030)
CONTROL	1.579			0.053		0.226	
	(6.656)			(2.219)		(2.094)	
PPAEXP		0.400	0.172		0.177		
		(5.239)	(1.304)		(3.662)		
PTEXP		0.068			0.161	0.784	
		(1.463)			(1.219)	(5.342)	

Table 8d: Estimated Coefficients of the Demographic and Home Background Variables: Mexican Americans

	Dependent Variable						
Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SEX	-0.174	-0.488	-0.086		0.247	0.371	-0.032
	(-2.985)	(-6.104)	(-2.712)		(7.570)	(7.402)	(-3.717)
AGE	-0.361	-0.180	-0.121		-0.049	0.062	-0.015
	(-6.061)	(-2.495)	(-3.720)		(-1.470)	(1.577)	(-1.710)
SES	0.160	0.070	0.082	-0.060	0.011	-0.091	0.047
	(4.474)	(1.741)	(4.174)	(-2.655)	(0.552)	(-2.935)	(8.723)
INFO	0.140		0.096	-0.063	0.089		0.012
	(3.708)		(4.643)	(-2.765)	(4.184)		(2.092)
TWOP	0.235		-0.010	-0.128	0.221	0.222	-0.002
	(1.847)		(-0.145)	(-1.920)	(3.102)	(2.837)	(-0.117)
NOBAS	-0.087		-0.047	0.026	-0.056		-0.008
	(-3.382)		(-3.388)	(1.861)	(-3.902)		(-1.982)
FL	-0.274	-0.266	-0.034	0.074	-0.058		-0.036
	(-5.036)	(-4.710)	(-1.154)	(2.777)	(-1.896)		(-4.434)
RBS	0.113		0.125		0.101		0.013
	(2.077)		(4.189)		(3.310)		(1.546)
PTAAT	-0.212		0.129	-0.069	0.128		0.015
	(-3.177)		(3.551)	(-1.866)	(3.422)		(1.507)
PTAS	0.164		-0.151	0.127	-0.268	-0.090	-0.002
	(3.039)		(-5.116)	(3.336)	(-8.832)	(-1.875)	(-0.269)
TC	-0.061	-0.243	0.187	0.135	0.144		-0.011
	(-0.418)	(-1.471)	(2.325)	(1.817)	(1.755)		(-0.490)

Table 8d: (Cont.)

Explanatory Variable	Dependent Variable						
	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
NTCHSCL	0.135	0.178	0.047	0.027	0.015		-0.006
	(3.087)	(3.759)	(1.959)	(1.310)	(0.607)		(-0.986)
LSTCHSCL	0.173	0.090	0.117		0.092		-0.004
	(4.501)	(2.011)	(5.566)		(4.292)		(-0.669)

Table 8d: (Cont.)

	Dependent Variable						
Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SEX	-0.032	-0.109		-0.024		0.191	0.201
	(-3.199)	(-3.683)		(-0.565)		(6.015)	(5.990)
AGE		-0.074		-0.113	0.057	-0.114	-0.036
		(-2.428)		(-2.599)	(1.271)	(-3.525)	(-1.175)
SES	0.030	0.162	0.060	0.045		0.048	
	(4.684)	(8.924)	(2.743)	(1.746)		(2.473)	
INFO		0.082		0.112		0.058	
		(4.285)		(4.067)		(2.823)	
TWOP		0.040		-0.003		0.055	
		(0.525)		(-0.033)		(0.800)	
NOBAS		-0.028		-0.030	-0.023	-0.060	-0.032
		(-2.113)		(-1.590)	(-1.214)	(-4.321)	(-2.448)
FL	-0.026	-0.096	-0.037	-0.017		0.002	0.059
	(-3.302)	(-3.474)	(-1.343)	(-0.430)		(0.083)	(2.147)
RBS		0.087		0.125	0.049	0.070	
		(3.154)		(3.167)	(1.254)	(2.346)	
PTAAT		0.190	0.119	0.034		-0.068	-0.077
		(5.604)	(3.517)	(0.696)		(-1.886)	(-2.169)
PTAS		-0.062		0.010		-0.007	
		(-2.266)		(0.251)		(-0.227)	
TC		-0.031		0.019		0.129	0.122
		(-0.420)		(0.183)		(1.610)	(1.720)
NTCHSCL		0.005		0.042		-0.025	-0.054
		(0.206)		(1.316)		(-1.054)	(-2.744)
LSTCHSCL	-0.011	0.054		0.066		0.054	
	(-2.092)	(2.759)		(2.354)		(2.576)	

Table 9d: Estimated Coefficients of the School's Student Composition Variables: Mexican Americans

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
AVSES	0.293	0.530	-0.190		-0.233	-0.076	-0.051
	(3.156)	(6.249)	(-3.749)		(-4.483)	(-1.379)	(-3.670)
PWPICLY	-1.049	-0.706	-0.467		0.243	0.618	-0.078
	(-3.552)	(-2.477)	(-2.894)		(1.472)	(3.781)	(-1.780)
PWPICLY2	0.172	0.088	0.074		-0.029	-0.087	0.013
	(3.749)	(1.968)	(2.954)		(-1.109)	(-3.350)	(1.944)
PWHITE	0.293		-0.010		-0.087		0.019
	(2.251)		(-0.142)		(-1.189)		(0.997)
PWHITE2	-0.012	0.006	-0.002		0.004		-0.001
	(-1.351)	(3.169)	(-0.424)		(0.755)		(-0.969)

Dependent Variable

Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
AVSES	-0.034	-0.076	0.070	-0.188	-0.080	-0.141	-0.083
	(-3.138)	(-1.617)	(1.876)	(-2.797)	(-1.348)	(-2.801)	(-1.859)
PWPICLY		-0.508	-0.059	-0.806		-0.118	0.103
		(-3.387)	(-2.095)	(-3.759)		(-0.735)	(3.471)
PWPICLY2		0.072		0.132		0.038	
		(3.082)		(3.968)		(1.529)	
PWHITE		0.114	0.017	0.236	0.111	0.144	
		(1.730)	(1.459)	(2.500)	(1.476)	(2.028)	
PWHITE2		-0.007		-0.017	-0.009	-0.009	
		(-1.585)		(-2.603)	(-1.684)	(-1.813)	

Table 10d: Estimated Coefficients of the Teachers' Variables: Mexican Americans

	Dependent Variable						
Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F	S.F
TAVR	0.170	0.223	-0.033		-0.047	-0.024	-0.003
	(3.383)	(5.184)	(-1.214)		(-1.656)	(-1.018)	(-0.464)
NTPRPUP	15.250		0.666	-6.335	12.385	10.369	-0.073
	(1.521)		(0.122)	(-1.567)	(2.206)	(1.768)	(-0.049)
TANYTCH	0.121		0.084		0.210	0.146	-0.002
	(1.051)		(1.340)		(3.261)	(2.099)	(-0.133)
PWTCHLY	0.180		0.140		0.114		-0.013
	(2.865)		(4.073)		(3.246)		(-1.430)
TASEX	0.513		0.297		0.576	0.292	0.026
	(1.613)		(1.710)		(3.236)	(1.700)	(0.543)
TPTC	-0 .024		0 .345		0.096	-0.292	-0.057
	(-0.061)		(1.606)		(0.437)	(-1.430)	(-0.972)
TPADTN	1.570	1.559	0.266	0.481	-0.196	-0.438	0.101
	(3.535)	(3.615)	(1.096)	(2.483)	(-0.788)	(-1.736)	(1.526)

AV.39

Table 10d: Estimated Coefficients of the Teachers' Variables:

Mexican Americans (Cont.)

Explanatory Variable	College Prep. Pgm.	Dependent Variable Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
TAVR		-0.017		0.017		-0.014	
		(-0.685)		(0.460)		(-0.504)	
NTRPUP		0.154		-4.192	-19.060	3.640	
		(0.030)		(-0.576)	(-3.020)	(0.667)	
TANYTCH		-0.037	-0.071	0.067		0.051	
		(-0.628)	(-1.399)	(0.807)		(0.819)	
PWTCHLY	-0.024	0.022		0.066		0.105	0.066
	(-2.873)	(0.687)		(1.441)		(3.074)	(2.036)
TASEX		0.244	0.226	-0.177	-0.206	0.084	
		(1.512)	(1.500)	(-0.767)	(-1.093)	(0.488)	
TPTC		0.293	0.350	-0.187	-0.286	-0.323	-0.304
		(1.467)	(1.938)	(-0.657)	(-1.181)	(-1.514)	(-1.973)
TPADTN	0.140	-0.490	-0.506	0.096		-0.028	
	(2.412)	(-2.168)	(-2.456)	(0.298)		(-0.115)	

Table 11d: Estimated Coefficients of the School Characteristics Variables: Mexican Americans

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	Dependent Variable						
	R.F.	S.F.	R.F	S.F.	R.F	S.F.	R.F.
FACILITS	-0.053	-0.077	0.007		-0.004		-0.002
	(-1.424)	(-1.900)	(0.323)		(-0.183)		(-0.303)
PROBLEMS	-0.036	-0.054	-0.007		-0.010		-0.006
	(-1.190)	(-1.726)	(-0.400)		(-0.620)		(-1.414)
AGES	-0.064		0.021		0.024		0.012
	(-1.494)		(0.872)		(1.011)		(1.873)
TEST	-0.090		-0.207		-0.155		-0.052
	(-0.554)		(-2.339)		(-1.702)		(-2.137)
PRPCPREP	0.850		0.862		0.298	-0.394	0.876
	(1.497)		(2.779)		(0.937)	(-1.146)	(10.340)
NTCHLV	(0.188)	0.166	0.026		-0.013	-0.037	0.004
	(3.924)	(3.506)	(1.008)		(-0.487)	(-1.265)	(0.573)
PRNMADG	-0.172	-0.146	-0.009		-0.099	-0.123	0.001
	(-1.710)	(-1.346)	(-0.157)		(-1.764)	(-1.926)	(0.077)

Table 11d: (Cont.)

Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
FACILITS		0.013		-0.012		0.019	0.032
		(0.671)		(-0.444)		(0.950)	(1.890)
PROBLEMS	-0.008	0.016	0.029	-0.023	-0.024	0.014	0.026
	(-2.033)	(1.060)	(2.106)	(-1.068)	(-1.274)	(0.875)	(2.014)
AGES	0.009	0.029		0.052	0.030	-0.018	-0.031
	(1.546)	(1.334)		(1.647)	(1.113)	(-0.777)	(-1.585)
TEST	-0.024	-0.178		0.025	0.203	-0.094	
	(-1.163)	(-2.163)		(0.211)	(1.671)	(-1.063)	
PRPCPREP	0.706	1.134		0.896		0.923	
	(8.970)	(3.930)		(2.173)		(2.987)	
NTCHLV		0.031		0.055		0.012	-0.026
		(1.259)		(1.576)		(0.445)	(-1.137)
PRNMADG		0.077		0.050		-0.016	
		(1.505)		(0.679)		(-0.301)	

AV.42

Table 12d: Estimated Coefficients of the Regional and Other Variables and the Multiple Correlation Coefficients: Mexican Americans

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SMSA	-0.007		0.002		0.005		-0.033
	(-0.041)		(0.021)		(0.047)		(-1.222)
NEWENG	1.388	1.163	-0.756		-0.674		0.117
	(2.511)	(1.989)	(-2.501)		(-2.176)		(1.414)
MIDATL	-0.289		-0.775		-0.833		-0.028
	(-1.055)		(-5.188)		(-5.443)		(-0.694)
LAKES	-0.054		-0.583		-0.570		-0.039
	(-0.244)		(-4.832)		(-4.618)		(-1.184)
PLAINS	-0.327	-0.826	-0.745	-0.293	-0.139	0.660	-0.041
	(-0.868)	(-2.083)	(-3.624)	(-1.552)	(-0.658)	(2.900)	(-0.733)
SEAST	-0.446		-0.433		-0.462		0.025
	(-1.607)		(-2.854)		(-2.973)		(0.604)
SWEST	-0.313		-0.061	0.168	-0.342	-0.221	-0.0008
	(-1.390)		(-0.497)	(2.023)	(-2.713)	(-2.068)	(-0.025)
NTLKGC	0.154	-0.131	0.137		0.001	-0.114	0.022
	(3.224)	(-1.882)	(5.228)		(0.055)	(-3.375)	(3.033)
NHWTV	0.005		-0.061		-0.057		-0.015
	(0.177)		(-4.097)		(-3.722)		(-3.775)
CONST	-0.372	7.328	0.389		-0.797	-2.324	1.555
	(-0.071)	(1.346)	(0.136)		(-0.273)	(-2.536)	(1.999)
R^2	0.3080	0.3000	0.2265	0.2241	0.2468	0.2454	0.1747
MLR^2	0.3080	0.4816	0.2265	0.6619	0.2468	0.4180	0.1747

Table 12d: (Cont.)

	Dependent Variable						
Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SMSA		-0.079		0.049	0.183	-0.025	
		(-0.866)		(0.375)	(1.703)	(-0.253)	
NEWENG	0.113	-0.205		-0.058	0.475	0.275	
	(1.515)	(-0.728)		(-0.144)	(1.209)	(0.913)	
MIDATL		-0.635	-0.621	0.513	0.568	-0.099	
		(-4.570)	(-4.385)	(2.583)	(3.506)	(-0.665)	
LAKES		-0.624	-0.549	0.240	0.262	0.117	0.166
		(-5.568)	(-5.142)	(1.497)	(1.921)	(0.976)	(1.789)
PLAINS		-0.463	-0.527	0.818	0.752	0.353	0.258
		(-2.422)	(-2.695)	(2.994)	(3.118)	(1.725)	(1.442)
SEAST	0.045	-0.299	-0.308	0.064		-0.115	
	(1.776)	(-2.121)	(-2.698)	(0.320)		(-0.759)	
SWEST		-0.154	-0.190	0.096		-0.052	
		(-1.347)	(-2.009)	(0.587)		(-0.420)	
NTLKGC		0.150	0.041	0.210	0.064	0.174	0.105
		(6.156)	(1.401)	(6.058)	(1.659)	(6.674)	(3.631)
NHWTV	-0.011	-0.048		-0.031		-0.010	
	(-2.742)	(-3.467)		(-1.555)		(-0.687)	
CONST	1.781	-3.094	-4.863	2.297	7.446	-4.652	-5.853
	(2.643)	(-1.168)	(-1.971)	(0.607)	(2.252)	(-1.640)	(-2.642)
R^2	0.1725	0.2260	0.2243	0.0963	0.0930	0.1899	0.3739
MLR^2	0.2701	0.2260	0.4752	0.0963	0.4095	0.1899	0.1884

Table 7c: Structural Form Coefficients of the Endogenous Variables: Puerto Ricans

Dependent Variable

Explanatory Variable	ACH	ACHMOT	DEMMOT	CPREP	EXP	SELFEST	CONTROL
ACH				0.050			0.191
				(3.774)			(3.274)
ACHMOT			0.259		0.325		
			(1.143)		(4.043)		
DEMMOT							
CPREP			-0.860				
			(-1.954)				
EXP		0.158		0.042		0.356	
		(1.250)		(1.272)		(3.069)	
SELFEST					0.307		0.526
					(3.109)		(6.123)
CONTROL	1.654					0.345	
	(8.583)					(2.888)	
PPAEXP		0.280	0.307				
		(3.404)	(2.405)				
PTEXP			0.300		0.210	0.333	
			(2.815)		(1.580)	(1.927)	

AV.45

Table 8c: Estimated Coefficients of the Demographic and Home Background Variables: Puerto Ricans

Dependent Variable

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SEX	-0.218	-0.473	-0.033		0.285	0.316	-0.035
	(-2.366)	(-4.557)	(-0.664)		(5.845)	(6.054)	(-2.668)
AGE	-0.211		-0.086	-0.055	-0.085		-0.016
	(-2.652)		(-2.020)	(-1.511)	(-2.008)		(1.452)
SES	0.107		0.082		-0.016	-0.077	0.026
	(2.297)		(3.282)		(-0.636)	(-2.504)	(3.930)
INFO	0.035	-0.124	0.216	0.148	0.204	0.085	0.032
	(0.622)	(-1.985)	(7.252)	(4.953)	(6.920)	(1.697)	(4.094)
TWOP	-0.072		0.105		0.108		0.022
	(-0.388)		(1.053)		(1.093)		(0.813)
NOBAS	-0.055		-0.003		-0.064	-0.054	-0.005
	(-1.420)		(-0.145)		(-3.150)	(-2.402)	(-0.901)
FL	-0.137		-0.028		-0.034		-0.029
	(-1.623)		(-0.620)		(-0.752)		(-2.416)
RBS	0.105	-0.173	0.104	0.067	0.077		0.029
	(1.265)	(-1.820)	(2.332)	(1.753)	(1.748)		(2.447)
PTAAT	-0.209		0.036		0.027		-0.003
	(-2.128)		(0.676)		(0.525)		(-0.240)
PTAS	0.179		-0.212	-0.087	-0.275	-0.100	0.014
	(2.184)		(-4.824)	(-1.845)	(-6.330)	(-1.526)	(1.204)
TC	0.640		0.156		0.009		0.036
	(2.990)		(1.364)		(0.081)		(1.194)

Table 8c: (Cont.)

Explanatory Variable	Dependent Variable Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
NTCHSCL	0.134	0.128	0.033		-0.011		0.015
	(2.102)	(1.970)	(0.961)		(-0.323)		(1.705)
LSTCHSCL	0.110		0.081	0.060	0.135	0.095	0.004
	(2.131)		(2.937)	(2.846)	(4.934)	(3.032)	(0.574)

Table 8c: (Cont.)

Explanatory Variable	College Prep. Pgm.	Dependent Variable Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SEX	-0.020	-0.114	-0.103	-0.010		0.149	0.195
	(-1.628)	(-2.521)	(-2.497)	(-0.152)		(3.139)	(4.476)
AGE		-0.133	-0.051	-0.093		-0.118	
		(-3.395)	(-1.313)	(-1.701)		(-2.867)	
SES	0.014	0.140	0.091	0.079		0.039	
	(1.772)	(6.125)	(3.762)	(2.469)		(1.644)	
INFO	0.024	0.129		0.103		0.090	
	(2.672)	(4.722)		(2.696)		(3.128)	
TWOP	0.024	-0.103		-0.208	-0.123	-0.007	0.110
	(1.014)	(-1.118)		(-1.621)	(-1.173)	(-0.070)	(1.269)
NOBAS		-0.033		-0.043		-0.061	-0.024
		(-1.752)		(-1.622)		(-3.044)	(-1.313)
FL	-0.019	-0.097	-0.037	-0.082		-0.087	
	(-1.772)	(-2.350)	(-1.007)	(-1.417)		(-2.003)	
RBS	0.020	0.070		0.085		0.154	0.082
	(1.817)	(1.712)		(1.483)		(3.610)	(2.088)
PTAAT		0.144	0.103	0.038		-0.068	-0.054
		(2.967)	(2.166)	(0.565)		(-1.340)	(-1.082)
PTAS		-0.064		-0.019		0.051	
		(-1.579)		(-0.333)		(1.208)	
TC		0.010		0.123		0.329	0.148
		(0.092)		(0.836)		(2.978)	(1.440)
NTCHSCL	0.010	-0.001		0.024		-0.002	-0.043
	(1.230)	(-0.043)		(0.540)		(-0.055)	(-1.510)
LSTCHSCL		0.017	-0.032	0.060		0.065	
		(0.652)	(-1.400)	(1.704)		(2.437)	

Table 9c: Estimated Coefficients of the School's Student Composition Variables: Puerto Ricans

Dependent Variable

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
AVSES	0.515	0.541	-0.024	-0.144	-0.115		-0.046
	(2.876)	(3.960)	(-2.451)	(-2.589)	(-1.214)		(-1.801)
PWPICLY	-0.861	-0.312	0.065	0.087	0.227		-0.044
	(-1.896)	(-3.287)	(0.266)	(2.710)	(0.944)		(-0.680)
PWPICLY2	0.108		0.008		-0.023		0.006
	(1.453)		(0.193)		(-0.580)		(0.573)
PWHITE	-0.098		0.062		-0.070		-0.020
	(-0.546)		(0.643)		(-0.734)		(-0.794)
PWHITE2	0.015	0.011	-0.007		0.001		0.002
	(1.093)	(3.623)	(-0.879)		(0.141)		(1.043)

Dependent Variable

Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
AVSES	-0.076	0.088	0.158	0.093		0.038	-0.100
	(-3.800)	(0.994)	(2.731)	(0.759)		(0.412)	(-1.473)
PWPICLY		-0.050	0.104	-0.452		-0.203	0.228
		(-0.225)	(2.061)	(-1.450)		(-0.867)	(6.082)
PWPICLY2		0.017		0.034	-0.045	0.047	
		(0.463)		(0.660)	(-4.732)	(1.232)	
PWHITE		-0.010	-0.025	0.044	0.067	-0.121	-0.058
		(-0.112)	(-1.566)	(0.354)	(3.760)	(-1.302)	(-3.410)
PWHITE2		-0.001		0.0001		0.008	
		(-0.157)		(0.015)		(1.069)	

Table 10c: Estimated Coefficients of the Teachers' Variables: Puerto Ricans

	Dependent Variable						
Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
TAVR	0.400	0.371	-0.055		-0.076		-0.011
	(4.300)	(4.308)	(-1.096)		(-1.537)		(-0.811)
NTPRPUP	28.458		2.680		-9.810		-5.052
	(1.634)		(0.287)		(-1.063)		(-2.035)
TANYTCH	0.128		-0.113		0.263		-0.036
	(0.665)		(-1.102)		(2.581)		(-1.380)
PWTCHLY	0.220		-0.007		0.099	0.104	0.002
	(2.563)		(-0.146)		(2.196)	(2.665)	(0.184)
TASEX	-0.285		-0.183	-0.180	0.064		0.054
	(-0.661)		(-0.793)	(-2.139)	(0.261)		(0.874)
TPTC	0.879		0.424		-0.339		0.083
	(1.239)		(1.114)		(-0.902)		(0.820)
TPADTN	0.740	1.245	0.095		-0.127		-0.095
	(0.967)	(1.711)	(0.231)		(-0.312)		(-0.875)

Table 10c: (Cont.)

Explanatory Variable	College Prep. Pgm.	Dependent Variable Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
TAVR	-0.029	-0.049		-0.077		0.050	
	(-2.613)	(-1.075)		(-1.199)		(1.036)	
NTPRPUP	-5.494	11.388		32.885	16.485	12.404	
	(-2.906)	(1.326)		(2.749)	(2.123)	(1.381)	
TANYTCH	-0.047	0.114		0.205		0.162	
	(-2.252)	(1.202)		(1.552)		(1.638)	
IWTCHLY		-0.029	-0.077	0.144	0.114	0.085	
		(-0.684)	(-1.886)	(2.473)	(2.408)	(1.936)	
TASEX	0.088	-0.127		0.071	0.260	-0.048	
	(1.972)	(-0.597)		(0.240)	(1.150)	(-0.215)	
TPTC		0.188		0.471		0.216	
		(0.538)		(0.967)		(0.590)	
TPADTN	-0.149	-0.575		-0.855		-0.369	
	(-1.579)	(-1.525)		(-1.627)		(-0.936)	

AV.51

Table 11c: Estimated Coefficients of the School Characteristics Variables: Puerto Ricans

Dependent Variable

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
FACILITS	-0.263	-0.180.	0.042		-0.059		0.018
	(-2.989)	(-1.995)	(0.890)		(-1.265)		(1.445)
PROBLEMS	-0.066	-0.038	-0.012		-0.024		-0.005
	(-1.245)	(-2.832)	(-0.412)		(-0.842)		(-0.654)
AGES	-0.040		0.0008		0.125	0.163	0.011
	(-0.526)		(0.018)		(3.079)	(4.656)	(0.997)
TEST	-0.047		0.027		-0.413	-0.254	-0.010
	(-0.161)		(0.173)		(-2.688)	(-2.047)	(-0.234)
PRPCPREP	1.999		1.312		0.526		1.032
	(1.849)		(2.265)		(0.918)		(6.702)
NTCHLV	0.277	0.197	-0.026	-0.060	0.059		0.013
	(2.698)	(2.081)	-0.474	(-1.580)	(1.088)		(0.894)
PRNMADC	-0.130		0.070		-0.143	-0.180	0.001
	(-0.701)		(0.702)		(-1.457)	(-2.206)	(0.036)

Table 11c: (Cont.)

Explanatory Variable	College Prep. Pgm.	Dependent Variable Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
FACILITS	0.031	-0.009		-0.031		-0.052	
	(2.765)	(-0.217)		(-0.520)		(-1.157)	
PROBLEMS	0.003	-0.039	-0.030	0.007	0.032	-0.006	
	(1.734)	(-1.497)	(-1.582)	(0.193)	(1.193)	(-0.210)	
AGES	0.016	0.016		0.037		-0.024	
	(1.850)	(0.431)		(0.701)		(-0.612)	
TEST		-0.158		-0.262		-0.234	
		(-1.102)		(-1.317)		(-1.567)	
PRPCPREP	0.956	0.592		0.302		0.478	
	(7.358)	(1.111)		(0.407)		(0.857)	
NTCBLV		0.024		0.055		0.066	
		(0.472)		(0.786)		(1.245)	
PRNMADG		0.031		-0.042		-0.017	
		(0.344)		(-0.330)		(-0.181)	

Table 12c: Estimated Coefficients of the Regional and other Variables and the Multiple Correlation Coefficients: Puerto Ricans

	Dependent Variable						
Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep. Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SMSA	0.330		0.051	0.176	0.211	0.421	-0.009
	(0.997)		(0.288)	(1.539)	(1.201)	(2.456)	(-0.189)
NEWENG	0.539	1.689	-0.286		0.085		0.041
	(0.746)	(2.418)	(-0.738)		(0.222)		(0.398)
MIDATL	-0.365		-0.190		0.278		0.008
	(-0.881)		(-0.857)		(1.267)		(0.128)
LAKES	0.159		-0.364	-0.307	-0.053		0.025
	(0.381)		(-1.631)	(-2.231)	(-0.238)		(0.413)
PLAINS	0.297		0.246		-0.086		0.035
	(0.424)		(0.653)		(-0.232)		(0.355)
SEAST	0.334	0.860	0.057		-0.090		0.027
	(0.592)	(1.956)	(0.189)		(-0.300)		(0.339)
SWEST	0.824	0.633	0.629		1.140	0.543	0.074
	(1.338)	(1.089)	(1.906)		(3.491)	(1.771)	(0.847)
NTLKGC	0.421		0.091		0.083		0.031
	(5.383)		(2.171)		(2.000)		(2.808)
NHWTV	-0.019		-0.054	-0.030	-0.064	-0.046	-0.006
	(-0.466)		(-2.445)	(-1.639)	(-2.930)	(-1.815)	(-0.950)
CONST	0.833		2.059		4.511		1.016
	(0.085)		(0.391)		(0.866)		(0.725)
R^2	0.2537	0.2464	0.2975	0.2919	0.3851	0.3766	0.1682
MLR^2	0.2537	0.4103	0.2975	0.4542	0.3851	0.4650	0.1682

AV.54

Table 12c: (Cont.)

	Dependent Variable						
Explanatory Variable	College Prep. Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SMSA		-0.085		0.353	0.265	0.240	
		(-0.519)		(1.551)	(1.702)	(1.405)	
NEWENG		-0.365		-0.233		-0.672	-0.698
		(-1.025)		(-0.471)		(-1.804)	(-2.405)
MIDATL		-0.271		-0.469		-0.148	
		(-1.329)		(-1.648)		(-0.692)	
LAKES		-0.057		0.107	0.257	0.220	
		(-0.280)		(0.374)	(1.426)	(1.024)	
PLAINS		0.097		0.291	0.695	-0.120	-0.367
		(0.282)		(0.604)	(1.845)	(-0.333)	(-1.216)
SEAST		0.053		-0.415		-0.283	
		(0.191)		(-1.070)		(-0.970)	
SWEST		0.589		0.178		0.127	
		(1.941)		(0.421)		(0.400)	
NTLKGC		0.170		0.359	0.150	0.269	
		(4.406)		(6.693)	(2.707)	(6.672)	
NEWTV		-0.034		-0.011		-0.016	
		(-1.700)		(-0.396)		(-0.734)	
CONST		7.919	6.836	-2.402	-6.550	-2.045	-0.921
		(1.635)	(2.126)	(-0.356)	(-1.371)	(-0.403)	(-3.315)
R^2	0.1653	0.2666	0.2618	0.1533	0.1491	0.2380	0.2331
MLR^2	0.2951	0.2666	0.4798	0.1533	0.3868	0.2380	0.5694

Table 7vv: Structural Form Coefficients of the Endogeneous Variables: Blacks

Explanatory Variable	Dependent Variable						
	ACH	ACHMOT	DEMMOT	CPREP	EXP	SELFEST	CONTROL
ACH		0.116		0.043			0.129
		(4.152)		(4.230)			(5.442)
ACHMOT			0.639			0.359	
			(3.357)			(2.481)	
DEMMOT							0.189
							(2.281)
CPREP	2.080				0.795		
	(6.844)				(4.247)		
EXP			-0.445	0.052			
			(-2.843)	(1.942)			
SELFEST		0.182			0.294		0.378
		(4.984)			(3.290)		(6.523)
CONTROL	0.912		0.473			0.787	
	(8.330)		(3.968)			(7.045)	
PPAEXP		0.418	0.134		0.146		
		(10.618)	(1.311)		(2.557)		
PTEXP				0.044	0.311	0.680	
				(1.561)	(1.902)	(4.828)	

Table 8vv: Estimated Coefficients of the Demographic and Home Background Variables: Blacks

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	Dependent Variable						
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SEX	-0.139	-0.290	0.016	0.094	0.232	0.191	-0.0005
	(-3.325)	(-6.803)	(0.753)	(4.101)	(10.898)	(4.735)	(-0.066)
AGE	-0.441	-0.157	-0.166	-0.044	-0.061	0.053	-0.055
	(-8.700)	(-3.128)	(-6.418)	(-1.765)	(-2.367)	(1.383)	(-6.312)
SES	0.235	0.079	0.088	-0.055	0.033		0.043
	(9.606)	(3.061)	(7.027)	(-3.266)	(2.614)		(10.158)
INFO	0.069		0.077		0.047		0.012
	(2.301)		(5.005)		(3.070)		(2.252)
TWOP	0.103		0.014	-0.152	0.045		0.016
	(1.230)		(0.330)	(-3.658)	(1.058)		(1.140)
NOBAS	-0.101	-0.057	-0.002	0.019	-0.006		-0.005
	(-5.282)	(-3.172)	(-0.159)	(2.058)	(-0.607)		(-1.577)
FL	-0.114		-0.016		0.069		-0.054
	(-2.147)		(-0.601)		(2.559)		(-5.908)
RBS	0.054		0.053		0.058		-0.003
	(1.530)		(2.960)		(3.244)		(-0.578)
PTAAT	-0.081		0.043		0.072	0.069	0.005
	(-2.037)		(2.091)		(3.550)	(2.707)	(0.690)
PTAS	0.111		-0.133		-0.190	-0.095	-0.001
	(2.559)		(-5.969)		(-8.562)	(-2.387)	(-0.134)
TC	0.220	0.291	0.035		-0.001		0.003
	(1.990)	(2.861)	(0.615)		(-0.023)		(0.138)

Table bvv: (Cont.)

Explanatory Variable	Dependent Variable						
	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
NTCHSCL	-0.004	0.070	-0.009		-0.005		-0.015
	(-0.133)	(2.296)	(-0.557)		(-0.275)		(-2.782)
LSTCHSCL	0.089	0.043	0.061	0.036	0.056		0.005
	(3.037)	(1.552)	(4.094)	(2.837)	(3.720)		(0.905)

Table 8vv: (Cont.)

	Dependent Variable						
Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SEX		0.038		0.156		0.162	0.079
		(1.643)		(4.477)		(6.293)	(2.900)
AGE	-0.019	-0.198		-0.238	0.091	-0.176	
	(-2.112)	(-6.991)		(-5.641)	(2.333)	(-5.649)	
SES	0.021	0.166	0.051	0.099	-0.024	0.063	
	(3.981)	(12.159)	(2.787)	(4.839)	(-1.199)	(4.212)	
INFO		0.097	0.035	0.082		0.019	-0.031
		(5.772)	(2.020)	(3.259)		(1.033)	(-2.028)
TWOP		0.145	0.107	-0.041		0.023	
		(3.118)	(2.103)	(-0.596)		(0.454)	
NOBAS		-0.032	-0.026	-0.001	0.025	-0.033	-0.017
		(-3.006)	(-2.560)	(-0.089)	(1.723)	(-2.801)	(-1.697)
FL	-0.040	-0.116	-0.045	-0.010		0.043	0.051
	(-4.771)	(-3.916)	(-1.424)	(-0.235)		(1.327)	(1.851)
RBS	-0.010	0.053		0.099		0.062	
	(-1.858)	(2.694)		(3.370)		(2.874)	
PTAAT		0.086	0.023	0.093		0.013	-0.028
		(3.852)	(1.053)	(2.798)		(0.539)	(-1.323)
PTAS		-0.086		-0.008	0.096	-0.015	
		(-3.532)		(-0.209)	(2.693)	(-0.547)	
TC		-0.014		-0.035		-0.079	-0.080
		(-0.231)		(-3.854)		(-1.164)	(-1.453)
NTCHSCL	-0.013	-0.029		0.003	0.063	-0.041	-0.046
	(-2.824)	(-1.608)		(0.122)	(2.856)	(-2.031)	(-3.019)
LSTCHSCL		0.014		0.043		0.048	
		(0.839)		(1.750)		(2.662)	

Table yvv: Estimated Coefficients of the School's Student Composition Variables:

Blacks — Dependent Variable:

Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
AVSES	0.216	0.375	-0.024		0.050	0.045	-0.069
	(3.062)	(6.969)	(-0.655)		(1.394)	(1.275)	(-5.676)
PWPICLY	-1.283	-0.554	-0.475	-0.038	-0.369		-0.111
	(-4.788)	(-2.255)	(-3.474)	(-1.777)	(-2.707)		(-2.413)
PWPICLY2	0.267	0.144	0.080		-0.057		0.022
	(5.770)	(3.302)	(3.386)		(2.417)		(2.824)
PWHITE	-0.300	-0.316	-0.020		0.095	0.182	-0.010
	(-2.907)	(-3.466)	(-0.389)		(1.802)	(3.714)	(-0.542)
PWHITE2	0.026	0.027	0.0001		-0.008	-0.015	-0.000002
	(3.052)	(3.684)	(0.023)		(-1.880)	(-3.572)	(-0.001)

Dependent Variable

Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
AVSES	-0.071	-0.063	0.102	-0.218	-0.118	-0.015	
	(-7.218)	(-1.603)	(3.195)	(-3.708)	(-2.725)	(-0.341)	
PWPICLY		-0.457		-1.071		-0.554	-0.039
		(-3.057)		(-4.801)		(-3.365)	(-1.754)
PWPICLY2	0.002	0.080		0.175		0.087	
	(1.070)	(3.086)		(4.541)		(3.070)	
PWHITE	-0.008	0.101	0.064	0.183	0.064	0.013	
	(-2.229)	(1.763)	(1.340)	(2.133)	(4.687)	(0.210)	
PWHITE2		-0.009	-0.005	-0.011		0.0006	
		(-1.881)	(-1.250)	(-1.534)		(0.109)	

Table 10vv: Estimated Coefficients of the Teachers' Variables: Blacks

	Dependent Variable						
Explanatory Variable	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
TAVR	0.118	0.104	-0.036	-0.028	-0.008		0.005
	(3.933)	(4.097)	(-2.343)	(-2.140)	(-0.506)		(0.922)
NTPRPUP	10.193	15.899	-1.160		9.300	11.480	-0.184
	(1.370)	(2.366)	(-0.306)		(2.453)	(2.829)	(-0.144)
TANYTCH	0.186		0.013	-0.075	0.181	0.104	0.012
	(2.360)		(0.319)	(-2.257)	(4.505)	(2.168)	(0.867)
PWTCHLY	0.098		0.044		0.041		0.012
	(1.838)		(1.616)		(1.498)		(1.309)
TASEX	0.039		-0.016		0.019		-0.029
	(0.192)		(-0.156)		(0.184)		(-0.854)
TPTC	-0.317		0.269	0.158	-0.045		0.010
	(-1.250)		(2.082)	(1.681)	(-0.352)		(0.223)
TPADTN	0.315		0.031		0.081		0.006
	(1.028)		(0.195)		(0.516)		(0.121)

Table 10vv: (Cont.)

Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
TAVR		-0.051	-0.038	-0.031	-0.022	0.008	
		(-3.069)	(-2.536)	(-1.263)	(-1.272)	0.435	
NTPRPUP		-1.994		-1.356		-5.847	-8.662
		(-0.480)		(-0.219)		(-1.278)	(-2.482)
TANYTCH		0.121		0.256		0.225	0.066
		(2.744)		(3.896)		(4.627)	(1.846)
PWTCHLY		0.067	0.051	0.069		0.077	
		(2.254)	(1.959)	(1.552)		(2.348)	
TASEX	-0.032	0.149	0.128	0.157		0.159	0.096
	(-1.184)	(1.330)	(1.222)	(0.939)		(1.286)	(1.020)
TPTC		0.100		-0.151	-0.311	-0.214	
		(0.711)		(-0.716)	(-2.210)	(-1.376)	
TPADTN		0.229		0.497	0.227	0.340	
		(1.337)		(1.947)	(1.101)	(1.804)	

Table 11vv: Estimated Coefficients of the School Characteristics Variables: Blacks

Explanatory Variable	Dependent Variable: Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
FACILITS	-0.025	0.031	-0.015	0.016	-0.038	-0.025	-0.006
	(-0.981)	(1.379)	(-1.155)	(1.454)	(-2.987)	(-1.649)	(-1.359)
PROBLEMS	-0.027	-0.054	-0.008		0.017		0.003
	(-1.439)	(-3.342)	(-0.833)		(1.735)		(0.872)
AGES	0.019		0.016	0.040	0.017		-0.007
	(0.508)		(0.856)	(2.587)	(0.898)		(-1.117)
TEST	0.010		-0.111	-0.049	-0.138		-0.001
	(0.099)		(-2.252)	(-1.194)	(-2.801)		(-0.073)
PRPCPREP	2.125		0.653		0.157		1.018
	(5.734)		(3.455)		(0.832)		(16.022)
NTCHLV	-0.037	-0.056	0.029		0.001		-0.002
	(-0.904)	(-1.579)	(1.413)		(0.068)		(-0.234)
PRNMADG	-0.248	-0.314	0.008		-0.055	-0.085	0.0004
	(-3.534)	(-4.810)	(0.219)		(-1.553)	(-2.101)	(0.033)

Table 11vv: (Cont.)

Explanatory Variable	College Prep.Pgm.	Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
FACILITS		-0.037		-0.080		-0.043	
		(-2.663)		(-3.812)		(-2.789)	
PROBLEMS	0.004	-0.011	-0.028	0.029		0.024	0.015
	(5.017)	(-1.020)	(-3.000)	(1.850)		(2.068)	(1.822)
AGES	-0.008	0.006		0.024		0.011	
	(-1.688)	(0.367)		(0.763)		(0.459)	
TEST		-0.053		-0.081		-0.035	
		(-0.988)		(-1.004)		(-0.586)	
PRPCPREP	0.860	1.123		0.455		0.199	
	(14.337)	(5.431)		(1.475)		(0.874)	
NTCHLV		0.029		0.063		0.017	
		(1.258)		(1.853)		(0.678)	
PRNMADG	0.014	-0.003	-0.041	0.169	0.137	0.082	0.040
	(1.315)	(-0.088)	(-1.016)	(3.236)	(2.861)	(1.895)	(1.169)

Table 12vv: Estimated Coefficients of the Regional and Other Variables and the Multiple Correlation Coefficients: Blacks

Explanatory Variable	Dependent Variable						
	Achievement		Achievement Motivation		Demonstrated Motivation		College Prep.Pgm.
	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.
SMSA	0.057		0.034		0.201	0.159	0.009
	(0.395)		(0.462)		(2.758)	(2.022)	(0.357)
NEWENG	-0.590	-0.808	-0.056	0.187	0.165		-0.026
	(-1.531)	(-2.521)	(-0.285)	(1.172)	(0.842)		(-0.396)
MIDATL	0.318	-0.411	-0.022		0.301		0.027
	(1.525)	(-3.534)	(-0.211)		(2.835)		(0.759)
LAKES	0.619		0.054		0.232		0.032
	(3.415)		(0.579)		(2.513)		(1.026)
PLAINS	-0.023	-0.721	-0.033		0.166		-0.024
	(-0.070)	(-2.772)	(-0.203)		(1.013)		(-0.430)
SEAST	-0.284	-1.054	0.270	0.257	0.584	0.213	0.015
	(-1.058)	(-6.247)	(1.972)	(3.724)	(4.270)	(2.164)	(0.324)
SWEST	0.103	-0.798	0.339	0.123	0.364		0.043
	(0.352)	(-3.690)	(2.262)	(1.214)	(2.430)		(0.853)
NTLKGC	0.327		0.152		0.046	-0.078	0.037
	(9.759)		(8.913)		(2.723)	(-2.236)	(6.455)
NHWTV	0.013	0.051	-0.050	-0.016	-0.007	0.018	-0.013
	(0.690)	(2.829)	(-5.202)	(-1.697)	(-0.738)	(1.400)	(-3.938)
CONST	1.971	7.289	2.857	0.608	-4.234	-1.309	0.017
	(0.565)	(2.540)	(1.606)	(1.583)	(-2.384)	(-2.488)	(0.029)
R^2	0.2876	0.2839	0.1663	0.1651	0.1384	0.1368	0.1800
MLR^2	0.2876	0.5050	0.1663	0.5146	0.1384	0.2846	0.1800

AV.65

Table 12vv: (Cont.)

Explanatory Variable	College Prep.Pgm.	Dependent Variable					
		Expectations		Self Esteem		Control	
	S.F.	R.F.	S.F.	R.F.	S.F.	R.F.	S.F.
SMSA		0.133		0.254		0.109	
		(1.667)		(2.133)		(1.239)	
NEWENG		-0.370	-0.462	0.449	0.266	0.055	
		(-1.723)	(-2.394)	(1.400)	(1.051)	(0.230)	
MIDATL	0.029	-0.318	-0.378	0.607	0.266	0.557	0.128
	(1.671)	(-2.729)	(-3.892)	(3.494)	(3.123)	(4.337)	(2.122)
LAKES		-0.076	-0.124	0.328		0.438	0.117
		(-0.755)	(-1.324)	(2.178)		(3.927)	(1.765)
PLAINS		-0.091	-0.273	0.960	0.476	0.611	
		(-0.505)	(-1.569)	(3.574)	(2.523)	(3.081)	
SEAST		-0.130	-0.278	0.535		0.466	
		(-0.871)	(-2.490)	(2.397)		(2.822)	
SWEST		0.192	-0.175	0.861		0.608	
		(1.169)	(-1.324)	(3.520)		(3.367)	
NTLKGC		0.233		0.404		0.249	0.044
		(12.486)		(14.518)		(12.096)	(1.728)
NHWTV	-0.010	-0.040		-0.038		-0.005	0.011
	(-3.174)	(-3.792)		(-2.424)		(-0.399)	(1.095)
CONST		2.837	6.479	-6.941	1.802	-6.480	-3.329
		(1.459)	(3.414)	(-2.392)	(2.369)	(-3.022)	(-2.221)
R^2	0.1792	0.2333	0.2328	0.1328	0.1313	0.1139	0.1123
MLR^2	0.3199	0.2333	0.5262	0.1328	0.6397	0.1139	0.4456